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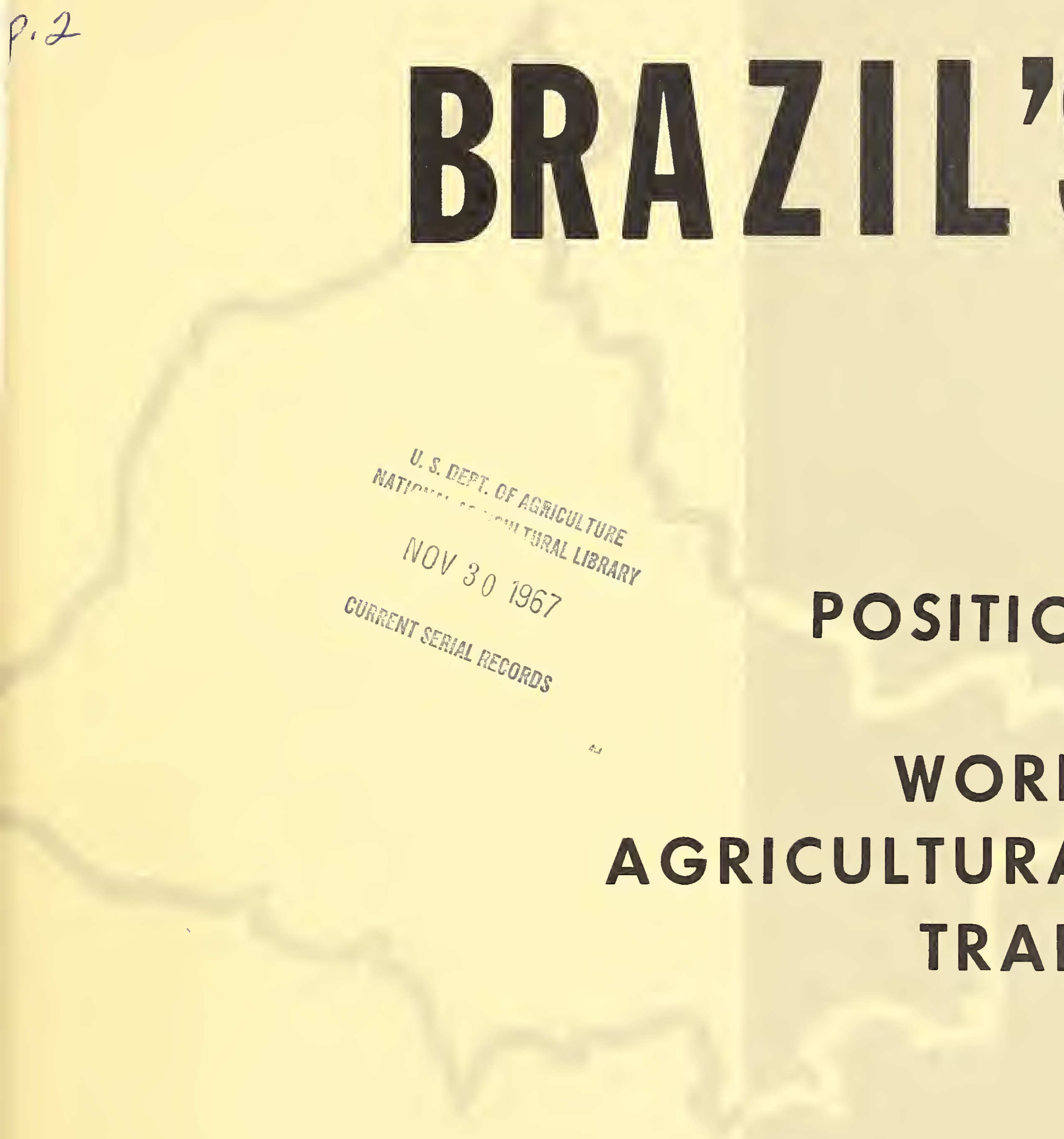
BRAZIL'S

POSITION IN WORLD AGRICULTURAL TRADE



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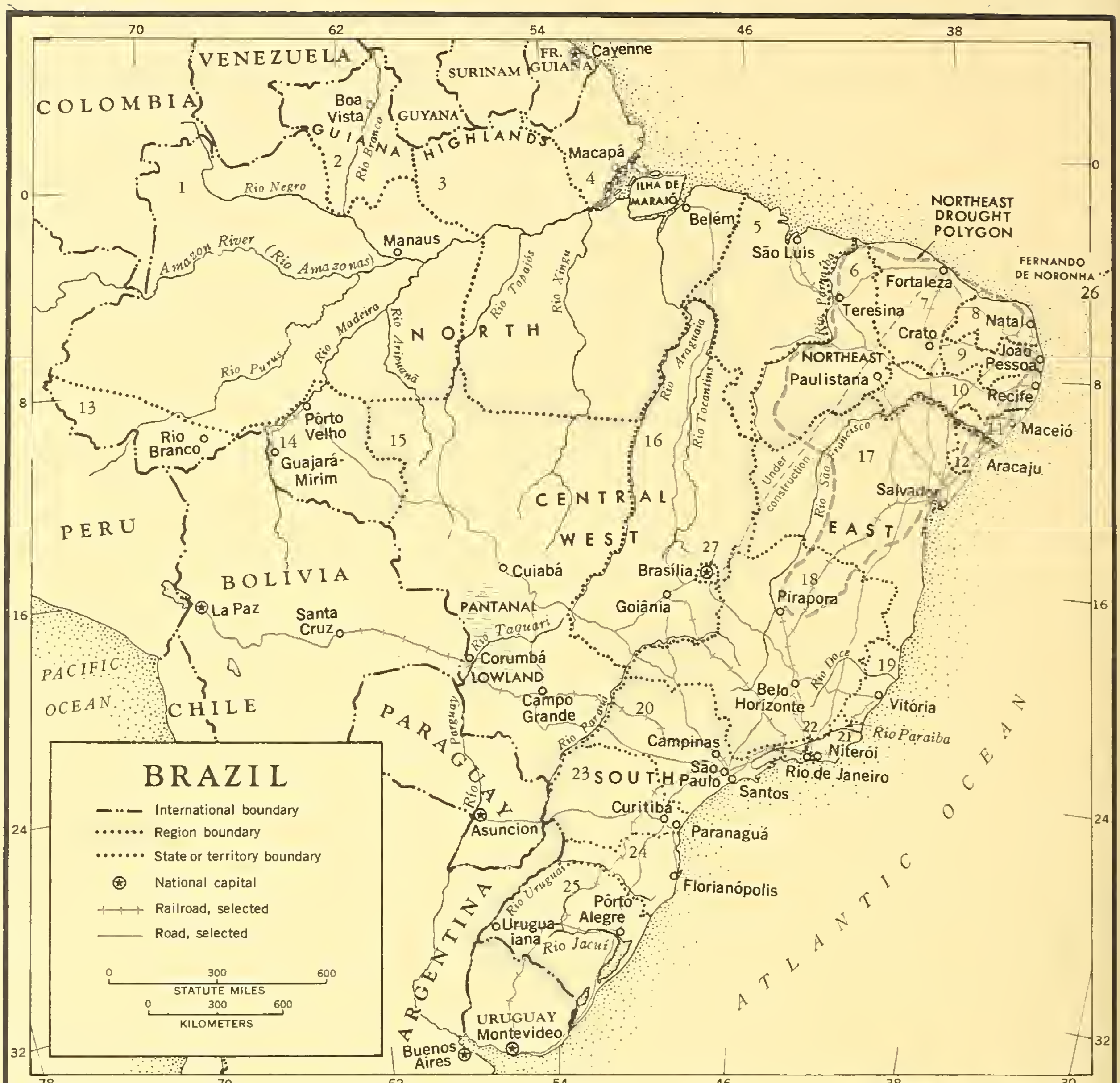

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FOREWORD

A continuing review and analysis of general economic and agricultural developments in Western Hemisphere countries is carried out as a part of the global research effort of the Foreign Regional Analysis Division of the Economic Research Service.

Principal research areas are situation and outlook, demand and competition, and long-range outlook. Results of this research are intended to provide to concerned groups, including farmers, businessmen, universities, and Government agencies, information on developments abroad which affect U.S. agriculture and trade.

The Brazilian study is another report in the demand and competition series. Other recent reports in this series include: The Agriculture and Trade of Costa Rica, ERS-Foreign 102; Peru: Market and Competitor for U.S. Farm Products, ERS-Foreign 157; and The Agriculture and Trade of Panama, ERS-Foreign 179.

Howard A. Osborn did the research for this report and prepared the basic draft. He has since transferred to the USDA Technical Assistance Mission to Bolivia, ERS. Further analysis and the addition of the most recent statistics were done by members of the Western Hemisphere Branch, including Samuel O. Ruff, Gae A. Bennett, Rena E. Perley, and Alyce Woodard.

Charles R. Davenport

Charles R. Davenport, Chief
Western Hemisphere Branch
Foreign Regional Analysis Division

EXPLANATORY NOTES

Area units are expressed in hectares (2.471 acres). Tons are metric tons (2,204.6 pounds). Dollar equivalents are used throughout the report. During most of 1965 the Brazilian cruzeiro was pegged at 1,850 to the U.S. dollar, compared with about 19 to the dollar in 1950. This rate was increased to 2,220 per dollar in November 1965 and maintained at about this rate in 1966. The deflator is the ratio of GNP in current prices to GNP in constant prices, usually 1949. Food consumption estimates are daily per capita availability at retail level unless otherwise specified.

Regional data in this study refer to the five physiographic regions used by the Brazilian Institute of Geography and Statistics (IBGE) unless otherwise noted: North, Northeast, East, South, and Central West. Basic Brazilian statistics are those published by the IBGE in the Anuario Estatistico do Brasil. Agricultural statistics are of the Servico de Estatistica da Producao and the Servico de Previsao de Safras of the Department of Economics of the Ministry of Agriculture. Data on National Accounts are supplied by the Instituto Brasileiro Economica Fundacao Getulio Vargas. Trade data are by the Ministerio da Fazenda, Servico de Estadistica Economica e Financeira. U.S. trade data are tabulated from data supplied by the Census Bureau, Department of Commerce. U.S. Department of Agriculture data are based on agricultural attache reports, department estimates, and other sources.

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SUMMARY

The United States took 46 percent of Brazil's farm and nonfarm exports and supplied 32 percent of total imports in 1955-59. However, the U.S. shares declined in 1960-64 when Europe achieved first place. While Brazilian exports of agricultural commodities showed about the same trends, the United States increased its share of Brazil's agricultural imports from 20 to 45 percent between 1955-59 and 1960-64, largely because of increased Food for Peace shipments.

Brazil may be expected to provide increasing competition for U.S. agricultural exports in the world market. While domestic demand is growing rapidly for most agricultural products, export surpluses of several competitive products may result from virtually unlimited land resources and possible increased productivity. Greater competition is most likely for corn, rice, vegetable oils, and tobacco.

Brazil is the fifth largest country in the world, with a population density among the lowest, and one of the last large frontiers capable of new cultivation. Virtually every crop known is produced in Brazil. Agriculture supplies about 90 percent of domestic food needs and more than 80 percent of Brazil's foreign exchange earnings. This sector employs half of the labor force and provides one-fourth of the gross national product. Total agricultural output has made large and generally steady gains since before World War II. In the present decade, the increase has been at the rate of 5.3 percent compared with 3.1 percent for population. In the 1960's, food output increased 5.5 percent per year, with a rate of 5.7 percent for crops overshadowing 3.5 percent for livestock products.

Estimated per capita food consumption in Brazil exceeds USDA nutritional standards for calories, protein, and fat. However, this average obscures considerable undernourishment and malnutrition, particularly in the North and Northeast.

Brazil's total trade has remained fairly steady since 1955. Both exports and imports have ranged between $1.2 and $1.5 billion. Four crops--coffee, cotton, cocoa and sugar--accounted for about 70 percent of total exports in 1960-64 with coffee providing over half. Agricultural imports accounted for .17 percent of total imports during the same period; wheat and wheat flour alone were 11 percent.

Principal food commodities produced in Brazil are cereals, sugar, starchy root crops, pulses, fruits and vegetables, vegetable oils, and livestock products. Corn and rice production has generally increased faster than domestic needs with varying exports in recent years; lowered wheat production has increased imports. Sugar production continues to be surplus to domestic and export needs. Output of starchy root crops, pulses, and fruits and vegetables has generally kept pace with increasing food needs. Edible oil production and exports have been increasing, with peanut and soybean oils showing greatest gains. Rapid gains in milk production have been largely offset by lagging meat production.

Principal nonfood commodities produced include coffee, cotton, cocoa beans, and tobacco. Coffee production continues to be surplus to domestic and export needs and efforts continue to shift coffee land into other crops. Cotton and cocoa bean production and exports have been generally steady in the 1960's. Tobacco output has showed steady gains, reflecting both increased domestic and export demand.

U.S. agricultural imports from Brazil averaged $481 million in 1960-64 or 87 percent of imports. Coffee, sugar, and cocoa beans and their products accounted for about 78 percent of the total. U.S. agricultural exports to Brazil in the same period averaged $100 million, of which 84 percent was wheat and wheat flour. Other grains and products, dairy products, pulses, and edible oils accounted for most of the remainder.

Population growth and a strengthened economy can be expected to increase Brazil's total agricultural needs. However, U.S. agricultural exports to Brazil can expect increased competition from other countries. The principal import will continue to be wheat and Argentina the principal competitor.

Brazil's Position in World Agricultural Trade

Western Hemisphere Branch
Foreign Regional Analysis Division

INTRODUCTION

In production, area, and population, Brazil is the largest country in Latin America. Over 82 million people, occupying a mainly tropical area larger than the 48 contiguous United States of America, comprise the United States of Brazil. Brazil is the world's fifth largest country in area and eighth largest in population, yet it has one of the lowest population densities in the world. In terms of cultivated land, however, Brazil at about 1 acre per capita ranks not far above some of the more densely populated countries, such as India and Pakistan.

Beginning with the export of sugar from a coastal Portuguese settlement in the 19th century, Brazil's contribution to the world economy has been mainly agricultural (9).[1] Livestock producers penetrated the interior to raise meat animals to supply dried meat to the coastal sugar producers and hides for export. Since about 1850, coffee production has sustained the economy through successive periods of development while moving westward and southward through the States of Rio de Janeiro, Sao Paulo, and Parana. Rubber, cocoa, cotton, and rice have also contributed development booms but by 1960, after 450 years of development, 90 percent of the population and 93 percent of the cropland were located in less than half of the country's area and within 300 miles of the coast.

Recent planning for industrial and economic growth has included greater emphasis on agricultural development and integration of a largely agricultural society into what is becoming a predominantly urban one. Brazil's 22 states have a strong degree of autonomy that has at times limited the ability of the Federal Government to carry out economic programs. While successively a colony, an empire, and a democracy with an interlude of dictatorship, Brazil has maintained a strong preference for democratic processes.

Historically, Brazil has relied on heavy exports of agricultural products to pay for imports of largely nonagricultural raw materials and manufactures. In recent decades, however, rapid industrialization based on import substitution resulted in a decrease in the proportionate contribution of agriculture to the national product. Besides employing over half the labor force, agriculture continues to be a significant factor in the cost of living and in the cost of industrial production and is the main provider of foreign exchange for critical imports of fuel and industrial machinery. Import substitution in agricultural products met with mixed success. The Brazilian food processing industry has grown substantially. Larger wheat supplies to feed a growing urban population have been available only through imports.

Role of Agriculture

Agricultural production, ranging from wheat to rubber, generally supplies about 95 percent of the domestic needs for agricultural commodities and earns over $1 billion from exports annually--more than 80 percent of Brazil's foreign exchange earnings. Agricultural production employs about half the labor force and provides over 25 percent of the gross national product (GNP). In addition, a significant part of the industrial and commercial sector output is based on agricultural output; food processing, for instance, contributed 17 percent in 1960 to the product of the industrial sector and textiles 12 percent (11).

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[1] Underscored numbers in parentheses refer to items in the Bibliography, p. 86.

Cultivated acreage and agricultural production expanded by 50 percent in 1950-60, and this rate of expansion of output will need to continue in order to improve the diet and meet the needs of a growing population. Brazil has the land resources to produce most of its additional food needs and agriculture can be expected to continue as the major resource base of the Brazilian economy for some time to come.

Agricultural exports are largely nonfood products such as coffee, fibers, and industrial oils and waxes. Coffee alone earns about 50 percent of the country's foreign exchange. Cocoa, hides, castor oil, menthol, and many other minor industrial and pharmaceutical products contribute to Brazil's annual exports worth about $1.5 billion.

Economic Growth

Gross domestic product in 1965 totaled over $21 billion, but per capita disposable income averaged $201 and was among the lowest in the Western Hemisphere. During 1950-62, growth in GNP, measured in constant prices, was among the highest in the hemisphere and on a per capita basis averaged 2.8 percent a year (table 1).[2] Brazil's economic growth in 1963 and 1964 was negligible; 1965 brought a per capita increase of 3.8 percent, the highest since 1961; and 1966 dropped 1 percent per capita.

Besides agriculture, Brazil is strong in forestry and minerals. Iron ore exports, one of the most promising areas for development, increased from 1.5 million tons in 1953 to 2.8 million in 1958 and 9.7 million in 1964.

Brazil has been short on power sources. Domestic oil production meets only 25 percent of the country's rapidly growing needs and oil constitutes a major foreign exchange demand. Coal is used mainly in metallurgical industries (46 percent) and in production of gas and electricity (46 percent). Imported coal accounts for 40 percent of domestic use, competing with high-cost domestic production. Valuable hydroelectric sources have been developed slowly due to high costs, capital shortages, long construction periods, and distance from urban areas. Electricity is expected to be in short supply for the rest of the decade in spite of an increase in generating capacity of 66 percent from 1959 to a total of 6 million kilowatts in 1964. An atomic power plant is under construction and is scheduled to open in 1970.

High foreign exchange reserves following World War II, Government policies favoring industrialization in the early 1950's, and rising export prices to 1954 sustained the rapid growth rate (table 2). Beginning in 1953, multiple exchange rates and other import controls channeled foreign exchange into industrial development. Falling exports and declining export prices after 1954 were offset by reduced foreign exchange reserves and increased foreign indebtedness to maintain import levels. Budget deficits were covered by monetary issues contributing to higher inflation rates. GNP (measured in constant prices) increased at a compound rate of 5.6 percent per year during 1950-55, slowed to 2.2 percent in 1956, picked up again to 6.6 percent in the period 1957-62, slowed to 1.4 percent in 1963, and dropped to -1.9 percent in 1964 (table 3). In 1964, foreign exchange reserves began to increase and by late 1965 the inflation rate had been substantially reduced and some upturn in the growth rate was evident. An GNP increase of 7.0 percent was estimated for 1965.

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[2] All tables are in the appendix, p. 89.

The impact of growth has varied among the sectors of the economy. Based on provisional GNP data of the National Accounts Center of the Getulio Vargas Foundation, the index of sectoral output for 1963 was as follows (1949 =100):

Industry	318
Transportation and communication	272
Commerce	221
Agriculture	179
Rents	165
Services	152
Government	140
All sectors	211

The greater growth of industry, commerce, transport, and communications reflects the greater national needs in these areas. Agriculture, while advancing less than the economy as a whole, increased considerably faster than the population growth of 50 percent between 1949 and 1963.

Growth has tended to be concentrated in a few centers. Sao Paulo State alone accounts for over half of all industrial output. According to the national census, Sao Paulo increased its share from 48 percent of the country's industrial output in 1950 to 55 percent in 1960, and is also the leading agricultural State. Another 22 percent of industrial output comes from the adjacent States of Guanabara, Rio de Janeiro, and Minas Gerais. Rio Grande do Sul provided 7 percent, leaving 16 percent from Brazil's other 17 States and 4 Territories and Federal Districts (11).

Economic development has been directed toward both the capital needs and the consumption needs of the domestic economy. Capital goods and raw materials accounted for 54 percent of total industrial production in 1959, up from 34 percent in 1949. At the same time, imports of consumer goods declined from $168 million in 1950 to $82 million in 1960 (31). Exchange and tariff policies fostered import substitution, favored imports of investment goods, and restricted imports of goods competing with Brazilian production. As a result of this protection, production costs of domestic industry are generally higher than those in traditionally industrial nations and consequently Brazil's industrial exports, although growing, have not reached a significant volume.

The potentially large domestic market and the opportunity for access to Latin American markets through the Latin American Free Trade Association (LAFTA) tends to attract foreign capital, although such investment declined after 1958 but started upward in 1964 (table 2). Brazil produces much of its domestic needs for autos, trucks, and wheel-type tractors, and exports such items as business machines, machine tools, and electronic equipment.

Inflation has been an increasing economic problem during most of this period. From a yearly average of 11 percent in 1949-52 and 20 percent for 1953-60, inflation ballooned to 37 percent in 1961; 51 percent in 1962; and over 80 percent in 1963 and 1964. However, estimates indicate a drop to 45 percent in 1965 and 41 percent in 1966. Changes of this magnitude resist accurate measurement. However, the implicit deflator, derived from national income estimates at constant factor prices, comes closest to an unbiased measure and is the basis for these annual inflation estimates (table 1).

A number of factors contributed to the high inflation rate, including budgetary deficits, expanding monetary supply, and excess coffee production. Food prices, which accounted for 43 percent of the cost-of-living index, rose more rapidly than the average of prices of the remainder of goods and services. Also, wholesale prices for agricultural products, excluding coffee, increased faster than wholesale industrial prices and wholesale prices in general (10). Budgetary deficits as high as 46 percent of annual Government expenses and largely covered by monetary issue have been a major contributor to inflation. Currency in circulation increased by 21 times in 1955-64 (table 1). Excess coffee production tied up investment in production and storage equivalent to 1.4 percent of the gross domestic product from 1954 to 1962.

Early in 1964 an economic and political crisis was evident. At that time, after repeated rescheduling, 50 percent of Brazil's foreign debt of $3.9 billion was payable by the end of 1965. In January 1964, the wholesale price index passed 2,000 (1953 = 100). By March 31, 1964, the price index had passed 2,500, and the cruzeiro on the open market had fallen in value to 1,880 to the dollar, compared with 32.39 in 1950. There was a military takeover on April 1. Broad powers for Government reform were given to a newly elected president.

Development Goals and Policies

The 1964 Government undertook to combine a number of rather vague but desirable objectives of previous administrations into a workable program to control inflation, speed economic growth, and improve social welfare.

Since 1950, increased Government expenditures on development and economic growth had been financed largely by budgetary deficits. The National Development Bank lists 86 Government agencies in various aspects of economic development activities. The Government's share of new investment increased from 24 percent in 1955-56 to 37 percent in 1957-60, although private investment still carries the major burden of economic development. The Government plans to increase taxation and Government efficiency in order to maintain high levels of Government investment without deficit financing.

Sectoral and regional development plans were designed to improve coordination and control of development efforts and counter unbalanced regional development throughout the nation. The Federal Government set up a number of regional planning and development agencies to promote agricultural and industrial development in various regions, including the Northeast drought area, the Amazon region, the southwest frontier, the Sao Francisco Valley, the Tocantins River Basin, and the Paraiba Valley. In 1964, a Ministry of Regional Development was instituted to coordinate these agencies and several others. An agrarian reform law was passed late in 1964.

In 1964-65 the Government gradually approached a uniform exchange rate by replacing the system of multiple rates which had been used in the previous decade. The previous system provided a subsidized rate for imports of capital goods and other inputs necessary for industrial development, a high rate for goods competing with domestic output, and variable exchange rates for exports. The variable export rates, which permitted the Government to absorb part of the foreign exchange generated from exports, lapsed by 1964 with exchange contribution quotas (a type of export tax) on coffee as the main exception. The Government continued the auction of exchange permits for nonessential imports and taxes on exchange used for services were continued.

Balance of payment problems were approached by attempting to diversify and increase exports; maintain export prices of coffee and cocoa; encourage foreign investment; and reschedule foreign debt. The new Government removed some of the major barriers to foreign capital and expects the growth rate of such investment to accelerate again to at least 2.5 percent per capita.

The Economic Action Program, 1964-66, by Brazil's new Government, had similar objectives to the previous Government's 1963-65 plan but a more stringent approach. The Government sought to reduce inflation to a level of no more than 10 percent per year during 1964 and 1965, and to resume per capita economic growth rates of 2 percent or more per year. At the same time, it sought a wider sharing of the benefits of growth through greater employment opportunities and by reducing regional and sectoral disparities in income. To minimize the restriction on growth of recurring deficits in balance of payments, the Government maintains close control of trade and foreign exchange. These goals have been central to Brazilian Government policies under several administrations. Differences of approach and a measure of conflict among the goals, however, permitted considerable shifts in emphasis from time to time. The program also contained policies regarding expansion of the money supply, wages, foreign exchange, the banking system, housing, education, development of the securities market, social security, and farm price supports.

Reduction in the spiraling inflation rate received major emphasis even at the cost of temporary reduction in economic growth. Progress toward inflation control at least prevented its further escalation during 1965 and 1966. The major attack on inflation comes from a curb on Government deficits through increased income, lower expenditures, and increased efficiency.

A 10-year development plan is being prepared, probably for 1967-76. This plan may be first drawn up for 1967-71, and then 2-year action programs will translate these plans into operation. The new plan is expected to have the same general objectives as former plans but will place more emphasis on execution. The plan will aim at a per capita growth in GNP of over 2.5 percent per year, a level consistent with Alliance for Progress objectives and with Brazil's past growth.

INCREASED AGRICULTURAL DEMAND

Both domestic and foreign demand for Brazil's agricultural output have been strong in terms of increased quantities taken. With agricultural output increasing rapidly, Brazil has encountered only temporary market surpluses (except for coffee) and at times has had to restrict exports and increase imports to ensure domestic food supplies. Overall demand continues to be dominated by the domestic market and continued growth in domestic demand due to population and income growth seems assured. However, increased foreign sales of a number of commodities over the past several years indicate an ability also to compete generally in world markets at world prices for traditional and other agricultural exports. Brazil's internal market structure, however, restrains both production and demand.

In the past, Government policy resulted in considerable distortion of the pricing system. Rapid changes in the production and marketing policy, added to previous distortions, limits the value of past trends in projecting the future. A comparison of past trends in quantities and prices of commodities, therefore, may not necessarily show the current strengths of foreign and domestic demand in competing for allocation of agricultural resources.

Export Demand

Export demand is built on the country's need for foreign exchange and the world's demand for products. Exports take only about 15 percent of the value of Brazil's agricultural production and 80 percent of this is accounted for coffee, sugar, cotton, and cocoa beans, or their products. The remainer consists largely of nonfood products, such as tobacco, sisal, carnauba wax, and castor oil.

Due to the nature of these export commodities, competition between the domestic and export markets in Brazil is much more limited than it is, for example, in Argentina, which exports a broad range of staple food crops. Brazil's export sector cannot readily make up shortfalls in domestic food needs in poor years. In addition, the permanent plantings of coffee, cocoa, and most other export crops, including perennial cotton, limit the ability of production to shift from export to domestic crops in response to changing demand. Domestic and foreign demand, however, do compete for cotton and sugar supplies and for small proportions of meat, corn, rice, and soybeans in most years.

The increased volume of exports of Brazilian agricultural products generally compensated for the decline in export prices caused by the fact that world production of coffee, sugar, and cotton expanded during the last decade at a faster rate than demand. Recent trends indicate continued expansion in world production of tropical products and an early reversal of the downward price trend appears unlikely.

Through multiple exchange rates, variable export taxes, and export quotas, the Government managed to insulate the domestic market from some of the fluctuations in world market prices. Generally, world prices exceeded domestic prices and the

Government retained some of this price difference. As world prices fell, the Government had to give up much of this revenue and in 1965 coffee and meat were the only products for which export prices were significantly above domestic prices.

Government policy reduced the impact of foreign demand on domestic production for each of the four major exports and some minor ones. Coffee marketing has been controlled in Brazil for most of this century. In an independent effort to maintain world prices, Brazil usually restricted coffee exports below the allowable quota under the World Coffee Agreement and its predecessors. Cocoa, produced mostly for export, is subject to export taxes (contribution quotas). Export quotas were also in effect from October 1964 through January 1965, when the International Cocoa Agreement (ICPA) collapsed. Domestic needs are given first call on cotton and sugar production despite world demand. The amount of sugar production and exports depends largely on Government regulations.

Export surpluses for some food and other minor or nontraditional export commodities arise from factors in domestic policy or in weather as much as from higher world prices. Brazil is the only or the major world supplier for certain industrial oils and waxes. Development of synthetics and increasing supplies of competitive products from other areas, however, have generally kept prices and exports of these commodities from rising significantly.

In spite of these many uncertainties and variables, total agricultural exports will likely be maintained or increased. Export trade will probably continue to be dominated by the four traditional export commodities, supplemented by an increasing proportion of other nonfood products and food commodities in years when output is in excess of domestic needs.

Domestic Demand

Demand for Brazil's agricultural output is, and will continue to be, dominated by domestic needs--mainly for food commodities. Total demand for food is determined primarily by population, income levels, and nutritional requirements. Demand for individual food commodities is also influenced by diet preferences and the substitutability of many food items in the diet.

The analysis of these factors and present food consumption levels and trends shows both actual demand in the past and direction in the future. Principal food commodity groups considered here are cereals, sugar, starchy roots, pulses, nuts, fruits and vegetables, meat, fish, edible fats and oils, milk and cheese, and eggs. These commodity groups represent total food consumption (excluding alcoholic beverages). Coffee, cocoa, tobacco, and fibers represent the major nonfood commodities produced, with consumption and demand considered under the commodity section of this report.

POPULATION

Brazil's 1900 population of 17.4 million has doubled and redoubled and is expected to double again before the end of the century. Of the 19 million increase in population in the 1950's, 13 million was urban (table 4). The urban population increased from about 36 percent of the total in 1950 to over 48 percent in 1966. These new city dwellers are purchasers rather than producers of food, and provide a rapidly growing commercial market for agricultural production.

Population grew 63 percent from 51.9 million in 1950 to 84.7 million in mid-1966. At a compound rate of 3.0 percent increase per year, a population of 95.3 million is projected in 1970. A 34 percent growth in population is expected in the next decade and a doubling of the population in less than a quarter-century.

Urban population grew at a compound rate of 5.0 percent a year in 1950-65 with less than two-thirds of the growth coming from natural increase and the remainder from rural-urban migration. On the basis of growth rates during the fifties, urban population of Brazil could reach 51 percent of the total by 1970. In spite of the migration to cities, rural population has maintained a steady growth rate of 1.8 percent per year since 1950.

Supplementing the urban shift, population concentration also is changing regionally toward the south and west. Two regions, the South and Central West, contained 25.7 percent of the population in 1900, 36.0 percent in 1950, and 39.2 percent in 1960.

The net effects of shifting population on food consumption cannot be derived from available data but certain observations are pertinent. Industrial growth and the higher level of urban wages attracted rural people to the cities faster than they were able to find jobs. Urban unemployment has been growing and the rural population has not always been able to improve its level of consumption by moving to the city. Some small farmers, for instance, may eat well above the minimum subsistence level because they lack markets. A minimum urban income, on the other hand, usually must provide for a number of other consumption items, such as housing, transportation, and better clothing. Further, food availabilities vary between rural and urban areas. Perishability and transportation costs make some foods such as fruits and vegetables, that may be in surplus supply in producing areas, relatively expensive in the city. Thus, an urban migrant may need to reduce his food consumption even though his cash income increases.

In spite of these conflicting tendencies, two effects of population changes stand out: Food demand will tend to increase in proportion to population at an annual compound increase rate of 3.0 percent to 1970; and market demand will tend to increase faster than total demand due to the increasing proportion of the population living in urban areas, with uncertain effects on food consumption levels as such.

INCOME

As family income increases, families tend to spend a greater total amount on food but the proportionate share of total income spent on food tends to drop (table 5). The increasing expenditure on food may represent changes in quantities, shifts in types of food, increased quality, more services, or a combination of these.

In 1950-61, per capita disposable income in Brazil increased 24.5 percent or at a compound rate of 2.0 percent per year in constant prices (table 3). The rate increased to 2.4 percent in 1962, declined to -1.5 percent in 1963, dropped to a low of -4.7 percent in 1964, and rebounded with a 4.1 percent increase in 1965. How increases in income have affected per capita food consumption is largely a factor of distribution of income. If the pattern of income distribution within the country remained basically unchanged and required supplies were available at the same relative prices, per capita consumption might increase more or less in line with increased income and income elasticities of demand. If, however, income distribution showed a major shift, income elasticities based on a previous period would need to be adjusted.

Evidence shows a significant shift in proportionate distribution of income both between rural and urban sectors and between high and low-income groups. The shift toward urban living where per capita incomes average three times the level of rural incomes was a substantial factor in the strong overall increase in per capita income for the whole country (table 6). However, the increased proportion of low-income to high-income families in the cities has apparently diluted the overall per person income gains.

Few data are available to show the distribution of increases in per capita income. Analysis of distribution of income between rural and urban sectors based on agricultural and nonagricultural income is indicative if not precise. Both agricultural and nonagricultural income nearly doubled from 1950 to 1963. Population growth, however, absorbed most of the additional income, and per capita income in the nonagricultural sector apparently declined slightly. Statistically, the shift in population to urban areas represents a sharp increase in average money incomes for people shifting from rural to urban areas since 1950. Increases in per capita income for Brazil as a whole, however, appear to be largely phenomena of transfer of people from the low-income rural areas to higher income urban areas, where they have increased national per capita income but tend to depress urban income. The effect on individual real income also may be slight. For instance, where minimum wage levels in urban areas are only 10 to 20 percent higher than in rural areas and living costs are substantially higher, the individual may show little improvement in real levels of consumption by moving from the rural to the urban sector.

The continued availability of surplus labor, in both rural and urban areas, also will tend to reduce gains in real income for unskilled labor--the bulk of the labor force. At the same time, growing demand for skilled labor may lead to substantial increases in personal income among certain sectors of the population and sustain a high level of demand for high-income-elasticity foods.

Food consumption is partly affected by the population shift, because the new city dweller may have to spend more of his income for such nonfood items as transportation and housing (that cost little or nothing in his rural area), leaving him less to spend on food. There is a real need among families at marginal income levels to increase food consumption. This is expressed, especially for poor families, in high income elasticities for cheap food (table 5).

Per capita disposable income for the country as a whole is expected to increase and may regain rates of growth as high or higher than those prevailing during the 1950's. However, real per capita income or actual consumption levels may show lower rates of growth than disposable income because of population shifts and the greater cost of urban living. Therefore, within limits, total food demand may follow income increases, with the likelihood that demand for lower valued foods may be greater and that for more expensive food less than anticipated. Also, supply factors and substitutability of commodities will probably greatly modify demand projections based solely on income elasticities.

Using 1959-61 as a base period, per capita disposable income should at least increase at a compound rate of 1.6 percent annually through 1970. This would result from the annual growth rate of 0.8 percent from the base period through 1965 and 2.5 percent for 1966-70. The rate of growth for the later period is considered reasonable since the 1966 rate of increase is expected to be near the 4.1 percent for a year earlier. Also, it is compatible with the development goal of over 2.5 percent for GNP growth for 1967-76, a goal which is realistic in terms of growth in earlier periods.

CONSUMPTION LEVELS AND TRENDS

USDA studies ranked Brazil's daily 2,714 calorie consumption fourth in Latin America in 1959-61, behind Argentina, Uruguay, and Cuba (33). Both food imports and per capita production continued to gain through 1963, probably putting Brazil third in Latin America and ahead of Cuba in consumption. A temporary decline in available supplies caused by lower 1964 production and reduced imports in early 1965 was countered by larger 1965 production; per capita consumption probably has continued to increase.

Brazil has relatively favorable average per capita consumption levels, well above USDA minimum standards and above the Latin American average (table 7). Food supplies are not well distributed, however. Indications are that food consumption in the South is well above the national average, but many low-income groups--particularly in the Northeast, the North, and urban slums--have insufficient calorie intakes and diet imbalance. For the Northeast's 14.5 million people, daily food consumption was estimated at 2,000 calories per capita in 1957, well under both the minimum standard and the average for Brazil (16). In this area, corn and mandioca (cassava) largely dominate the diet, supplemented by beans and other low-value foods. The level of protein consumption in this area is very low. Reportedly, increased food shipments to this area from the East and South to offset a growing deficit have resulted in sharply increased food costs.

Comparison of actual changes in per capita consumption between 1956-58 and 1959-61 with changes that might have been anticipated from income growth and available estimates of income elasticities of demand shows considerable disparities (table 8). The caloric value of total consumption was well above that expected. In general, consumption of low-value, high-calorie commodities also increased more rapidly than would have been expected from analysis of income elasticities. Conversely, consumption of high-income-elasticity foods as a group increased much less than would be expected, largely due to a decrease in per capita meat consumption but with less than expected gains in fats and oils. Consumption of milk and cheese increased somewhat more than expected, as did that of pulses and fish, which showed large percentage gains due to previous very low consumption levels and related supply factors. The same tendencies are evident in FAO food balances over a longer period, 1951-52 to 1957-59 (6, 8).

Differences in actual and calculated consumption in these two periods for principal commodities or commodity groups probably indicate both a need for adjustment of estimated income elasticities and the influence of supply factors. Major commodity differences were higher than expected consumption of cereals, starchy roots, and sugar, and lower than expected consumption of meat. However, the higher and lower consumption just offset each other; these four basic commodity groups contributed 76 percent of total consumption in both periods. Rapid production gains for the first three commodities made up for lowered meat output. Within the cereals group, larger than expected gains for corn and rice consumption and production more than offset a decline in wheat consumption which was caused by reduced output and imports.

Variations in consumption changes for fats and oils, pulses, fruits and vegetables, and eggs represented less significant differences. Variations for nuts and fish were probably mostly statistical, in view of the minor importance of these commodities.

Cereals as a group provided over a third of calorie intake in 1959-61. This was much less than that for most countries, and was 85 percent of the Latin American average cereal consumption for this period. Within the group, rice supplied 394 of the 932 daily cereal calories in 1959-61. Rice consumption also has shown the greatest growth, averaging over 4 percent annually in this period. Corn provided 299 calories per day and increased 2 percent annually. Wheat consumption actually declined 3 percent per year and averaged 234 calories per day in 1959-61. Minor cereals and cereal products provided the remaining 5 calories per day in the cereal category.

Sugar supplied 417 calories in 1959-61, or 15 percent of total calories, and consumption increased at 2.5 percent yearly. Brazilian sugar consumption was 105 percent of the Latin American average for this period, but was less than in many of these countries and surprisingly low in view of the country's production capacity.

Starchy root crops were the second most important consumption category, supplying 503 calories per day in 1959-61, mostly mandioca and its products. Consumption of starchy root crops in calories was as follows:

Mandioca (fresh-cooked)	105
" (product)	328
Potatoes	23
Sweetpotatoes	47
Total	503

Root consumption increased at the rate of 1.7 percent per year, with sweetpotatoes showing substantial gains, and white potatoes little or no change in daily consumption. Only four Latin American countries consumed more starchy roots in this period, and Brazilian consumption was 153 percent of the area's average.

The category of pulses, mostly dried beans and including some dry peas, lentils, soybeans, and peanuts, supplied 218 calories per day or 8 percent of total calories and 21 percent of total protein consumption. Pulse consumption was 141 percent of the Latin American average for the period, and increased by about 0.9 percent yearly.

Fruits and vegetables together supplied 128 calories, only 5 percent of total calories--65 calories were bananas, 54 were other fruit, and 9 were vegetables. Combined per capita consumption appeared to be increasing more than 1 percent each year. However, consumption was low--only 72 percent of the Latin American average for 1959-61.

At 28.8 kilograms of meat per year, in 1959-61, daily consumption was 205 calories per day, or 7.6 percent of total caloric consumption. About two-thirds of meat consumption, by weight, was beef and veal. On a calorie basis, 57 percent was beef and veal, 37 percent pork, and less than 6 percent other meat, principally mutton and lamb. Per capita meat consumption declined 2.3 percent per year, compared with anticipated gains of 1.9 percent per year based on income growth. Meat consumption was significantly lower than the Latin American average for this period.

Fats and oils consumption amounted to 160 calories, or 17.8 grams of fat per day, and amounted to 34 percent of fat consumption from all food sources. Slaughter fats provided just over one-half the total, vegetable oils 45 percent, and butter over 4 percent. Per capita fat consumption increased annually by about 1.7 percent over the period. Excluding butter, fats and oils supplied 153 calories per day with an annual uptrend between the two periods of 2.3 percent. Butter consumption declined from 9 calories per day in the earlier period to 7 in the later years. While Latin American fats and oils consumption was low compared with more developed countries for 1959-61, Brazilian consumption was only 76 percent of this average.

Milk and cheese provided 106 calories per day; about 90 calories were consumed as fresh milk, 10 calories as powdered and canned milk, and 6 calories as cheese. Over the period, annual consumption of milk and cheese products increased an average of 3.4 percent. Milk and cheese consumption was about 80 percent of the average for Latin America for 1959-61.

For other commodities, eggs provided an estimated 15 calories per capita per day with an indicated uptrend of more than 2 percent per year. Fish supplied 7 calories per day, with some evidence of an uptrend.

Other food consumption--coconuts, cocoa, and tree nuts--accounted for only about 23 calories in 1959-61, about five-sixths of which was coconuts.

Projections of food consumption for Brazil for 1970 have been made in other studies on the basis of the 1959-61 food balance, annual compound rates of increases of 3.1 percent for population and 1 percent for per capita disposable income, and estimates of likely per capita consumption changes with income shifts which differ from available income elasticity estimates (33, 36). Per capita consumption changes with income for 1959-61 through 1970 in these study projections were based on consideration of 1959-61 consumption levels relative to nutritional standards and those in comparable countries, observed consumption trends, Government food and agricultural policies, and general demand-supply relationships and trends. Projected per capita consumption levels were generally comparable to changes in 1956-58 and 1959-61.

Projections of consumption of principal food commodities for Brazil in 1970, including nonfood allowances for most commodities, were modified for this study (table 9) by increasing the income projection from an annual compound rate of 1 percent per capita to 1.6 percent.

Marketing and Transportation

Both domestic demand and exports increased rapidly in the past decade as indicated. However, as production areas moved farther from markets and as more of the population shifted to urban areas, Brazil's marketing system was under increasing pressure. The need for expansion and modernization of facilities affected all sections of the marketing system--farm marketing, market news, transportation, processing, wholesale and retail markets, and export facilities.

The high proportion of the population on farms as well as the price advantage to nearby production results in most food being consumed near production areas. Because of the rapid increase in numbers of urban consumers and increased consumption and exports, the marketing system in 1965 must have handled twice the volume of agricultural commodities handled in 1950. As urban demand grows, food must be moved in from greater distances at higher transportation costs.

The proportion of output coming from commercial farms increased markedly, but the expansion of market facilities did not always keep up with the rate of production growth. Much farm production is still sold in small lots and assembled by truckers and dealers for shipment to cities. Grains are largely handled in sacks.

There is little refrigerated meat transport or storage. Cattle are generally sold to traders or to packer-buyers and may change hands several times in marketing before slaughter. Many cattle producers have access to only a few buyers, many of whom are traders or speculators. Speculators group small lots and ship or drive them towards fattening or slaughtering areas near the coastal cities. Risks are high because of the almost complete lack of any type of market information for beef in the interior; consequently, marketing margins also are high.

In spite of the rapid rate of inflation and a general tendency for prices to slump at harvesttime, crops generally move to market right after harvest. A shortage of financing both for farmers and dealers, lack of farm storage facilities, and rapid deterioration of stored crops have been incentives to sell quickly. On the other hand, a storable commodity such as cotton is under less market pressure, and producers with enough money tend to retain ownership longer in order to benefit from price increases.

The Government has made major efforts to improve the farm-to-market transfer by improving storage, financing, and price supports. Some surpluses of perishable crops, however, may be wasted because marketing facilities are either unavailable or too costly to move surpluses to deficit areas.

Significant seasonal movement of crops from State to State takes place over Brazil as seasonal shortages develop. Regional specialization and fluctuations in regional production, combined with the immense size of Brazil, permit wide variations in prices of the same commodity in different markets. Improved transportation and reductions in shipping costs will help reduce price fluctuations and increase regional specialization.

Transportation is hampered by difficult terrain, the great size of the country, and the general shortage of development capital. Labor problems and inadequate port facilities limit the effectiveness of coastal shipping. Historically, coastal shipping has carried a large proportion of freight and passengers from one part of Brazil to another. Competition from roads, railroads, and air transport has reduced this share, as has a failure to modernize dock loading and shipping facilities. Coastal trade continued to increase until 1962 with subsequent decreases in 1963 and 1964. High cost and inefficient port labor hurt both coastal and foreign trade. Coastal shipping is still necessary to supply the Amazon region and also to move freight from the Northeast and South to Rio de Janeiro and Santos, the port of Sao Paulo. About a dozen other coastal ports and the Amazon river port of Manaus are also of importance.

Railroads were built largely to service the export sector. Much of the almost 40,000 kilometers of railroads penetrated the country in the late 19th and early 20th century, particularly in the States of Sao Paulo and Minas Gerais. Even though four-fifths of the trackage is owned and operated by the Federal Government there is really no national railroad system; many railroad lines are unconnected and three different gages exist. Rates are comparatively low, but service is generally so slow that although coffee, cotton, and other less perishable commodities move largely by rail, perishable commodities move by truck. Little freight moves over rail connections with Uruguay and Bolivia. Much of the system is in poor repair and underused; a few lines have been closed and more are threatened by the expanding highway system.

The rapidly expanding highway system is competing heavily with both railroads and coastal shipping. The area served by all-weather roads is comparatively small--17,000 kilometers of paved roads in 1963--but is increasing rapidly. During the rainy season, road transport is difficult and slow on the more than 94,000 kilometers of unpaved highways and 427,000 kilometers of municipal roads. Highway transport facilitated the westward movement of the frontier; outshipments of corn, cotton, rice, and meat from this area became possible though expensive. Previously, the frontier economy was largely self-contained in food production, with outshipments consisting mainly of cattle on the hoof. External road links, largely in the planning stage, include connections and improved connections with Montevideo, Uruguay; La Paz, Bolivia; Lima, Peru; and a trans-Amazon road, via Manaus, to Caracarai in the northwest with branches into Colombia and Venezuela. Estimates indicate that truck traffic is moving about 62 billion ton-kilometers per year, compared with 18 billion by railroads and 15.4 billion by river and coastal shipping.

Inadequate marketing facilities also limit effective utilization of Brazilian agricultural products. A number of modern processing and marketing facilities have been built in the last several years, but the rate of construction will need to be intensified to catch up with the rapid increase in urban demand.

Quality of produce is still quite variable. Commercial export firms and certain strong marketing organizations, such as the Rio Grande do Sul Rice Institute, are playing a part in improving grade standards and marketing facilities, but the level of this effort needs to be increased.

Purchase of commodities by wholesalers or processors is hampered by the general lack of use of national grade standards for commodities in domestic trade. For cotton, on the other hand, the existence of two grading systems is a problem. Government regulations require adherence to the local grade standards, but export sales are generally made on the basis of international standards. Similarly, various States have differing and sometimes conflicting grade requirements for some commodities, although on the whole few standards are used.

Slaughter cattle are generally bought on a carcass basis, with the producer or owner assuming all transportation cost, including losses from shrinkage, bruises, death, and condemnation. There are no official grade standards for live animals. Carcass beef is sometimes divided into two rather general grade designations. Preference is shown to carcasses with practically no outside fat covering. There is also discrimination by consumers against frozen beef.

Transportation and marketing facilities have usually been strongest in providing for the export market. The world market is organized to take any quantity of product offered in various grades and classes at a going price. Brazilian commodity buyers favor the export market for a quicker turnover of their money with less risk. There was a rapid buildup in exportable supplies of corn which were unable to reach world markets because of port congestion. Mechanized grain loading was installed in Santos and Paranagua in 1965 to increase loading capacity. Rail and port loading and unloading facilities also need modernizing to increase the traffic flow.

The availability of market information is limited largely to large cities and the coastal region. Sao Paulo, Porto Alegre, and Bahia have mercantile exchanges where daily or periodic quotations of the prices of certain crops are established. In addition, the Coffee Institute publishes daily coffee prices on several markets. The Sao Paulo quotations cover cotton, rice, potatoes, mandioca flour, and wheat flour. Porto Alegre quotations cover rice, lard, potatoes, onions, mandioca flour, beans, and corn. Bahia market quotations cover cocoa beans and castorseed. In addition, Sao Paulo, Minas Gerais, and perhaps certain other States put out information on prices paid to farmers for some crops. In late 1963, a market news service was instituted in Sao Paulo which was extended to Rio de Janeiro and Minas Gerais in 1966 and is scheduled for expansion to 11 other market centers.

Total storage capacity in 1962 was estimated at 66.9 million tons; 7.4 million tons was Government and the rest private. An additional 11.0 million tons was estimated to be needed by 1970, ranging from farm storage to port elevators and warehouses. The problem is complicated, because much of the storage is improperly located near the coast, while the center of agricultural output has shifted to the interior. Also, storage facilities are not vermin- and insect-proof. A large part of present storage capacity was originally designed for coffee.

Most retail food marketing is done in small specialized stores. A large amount of retailing is also carried out in large public markets or street markets, even in large cities such as Sao Paulo and Rio de Janeiro. Some trend towards supermarkets is evident in large cities, but they supply a small fraction of total demand.

Profit margins between grower and retail prices are reportedly not wide at any point in time. However, the tendency for prices to be depressed at harvesttime and to rise considerably during the marketing season provides wide marketing margins, which may or may not be needed to cover risk, storage losses, and inflation.

Improvement in marketing may result in increased marketing services and improved crop utilization without directly reducing marketing costs. Better utilization and reduced risk, however, should benefit producers as well as consumers. Faster and cheaper transportation may permit increased regional specialization and lead to reduced production costs. Strong urban demand and improved marketing facilities, therefore, promise to increase demand at the farm level, particularly for food commodities.

World supply problems and price management by national and international agencies indicate increased attempts to divert Brazil's productive resources from coffee, cocoa beans, and sugar towards crops in greater domestic and world demand; towards crops having a greater price elasticity of demand; and to crops where Brazilian production will be a smaller part of world trade and thus have less effect on world price levels. These influences point to continued rapid growth in demand for farm output with probably greater emphasis on crops competitive with U.S. agricultural exports. Changes in the market structure, however, may affect various commodities and regions in different ways, leading to future changes in relative prices and in production advantages which cannot be foreseen.

CHANGING AGRICULTURAL TRADE PATTERNS

Small fluctuations in the dollar value of trade during 1955-64 masked strong shifts in the composition of trade. Rapid economic development increased the pressure for imports of both production and consumption goods, which necessitated strict measures to ration foreign exchange because of generally declining world prices for Brazil's exports. Since about 1955, Brazil's trade policy has been based on import substitution rather than growth of export receipts. Total trade remained fairly steady at between \$2.6 billion and \$2.9 billion annually, with year-to-year fluctuations generally less than 5 percent. Both exports and imports ranged between \$1.2 and \$1.5 billion. Under exchange incentives and tight controls, imports shifted from consumer goods to production and capital goods. In spite of tight controls, deficits have characterized Brazilian trade since 1950 (table 2). The 1964 trade surplus of \$170 million came on the highest coffee prices since 1958 and the lowest import level since 1956. This surplus increased in 1965, with some drop in 1966.

Because agricultural trade has a critical impact on both foreign exchange balances and the national economy, policy decisions on these will always affect national agricultural policy.

Importance of Agricultural Trade

Agriculture continues to dominate Brazil's export trade, accounting for 84 percent of total exports in 1960-64 (table 10). Four crops--coffee, cotton, sugar and cocoa--accounted for about 70 percent of the total, with coffee providing over half. This one-crop dominance of Brazil's exports, while typical of some Latin American republics, contrasts sharply with other large Latin American countries, such as Argentina and Mexico, where the leading export commodities, meat and cotton, respectively, account for only about 20 percent of total exports.

As might be expected, agricultural imports are much smaller, 17 percent of total imports in 1960-64, and are limited mainly to wheat, natural rubber, and Temperate-Zone food products not produced in adequate amounts in Brazil's relatively small temperate production area (table 11). During 1955-65, agricultural imports have ranged from 14 to 24 percent of total imports. Wheat makes up about two-thirds of the total value, depending somewhat on local production and the stringency of the balance-of-payments situation.

Trade Trends

Since 1950, Brazilian trade statistics show fluctuations more than they show trend. In general, prices of both exports and imports have declined while quantities have increased, leaving values more or less unchanged.

No one index is a satisfactory indicator of Brazilian trade. Also, Brazilian exports are so strongly dominated by coffee earnings that it is most difficult to generalize without pointing out the specific effects of coffee prices and volume on total export trade and the capacity to import.

Coffee export prices rose from an index of 83 in 1950, to 124 in 1954, declined to 55 in 1963, and rose again to 73 in 1964 (1953 = 100) (table 12). Due to Brazil's dominance of world coffee exports, prices tend to be higher when the quantity shipped from Brazil is lower. The total value of coffee exports, therefore, fluctuates less than either price or volume. The value index, however, ranged from 100 in 1953 to 59 in 1962. The value of Brazil's exports of cotton, sugar, and cocoa, while less important in Brazilian or world trade, exhibited similar erratic behavior over the period of analysis.

The terms of trade (ratio between export prices and import prices) rose from 93 in 1950 to a peak of 134 in 1954, declined gradually to 84 in 1962, and rose somewhat in 1963 and 1964 (1953 = 100). The index of capacity to import (index of terms of trade times index of quantum or volume of exports) rose from 99 (1950-54) to 120 (1955-59) and declined to 116 (1960-64) (1953 = 100). Imports rose 20 percent, from 119 in 1950-54 to 143 in 1960-64; exports rose 26 percent, from 97 to 122, between the same two periods (1953 = 100). The composition of imports shifted, with greater proportions of fuel and raw materials and lesser proportions of finished capital and consumer goods in the later period (table 13 and (28)).

Exports of nonagricultural products have exhibited the strongest trends, increasing from 6 percent of total exports in 1950-54 to 16 percent in 1960-64. Iron and other ores were responsible for much of this gain, and manufactured goods also showed great gains, but from a small base. Progress is also evident in exports of nontraditional agricultural products, particularly corn, soybeans, sisal, jute, peppermint oil, and menthol.

Agriculture's share has dropped from 94 percent of total exports in 1950-54 to 88 percent in 1955-59 and 84 percent in 1960-64. Agricultural imports varied slightly, dropping from 16 percent to 14 percent and rising again to 17 percent of total imports for the same periods. Changing prices and changing volumes both played a part.

Total agricultural imports averaged $246 million in 1960-64, practically unchanged from the $245 million average for 1950-54, while nonagricultural imports showed some gains. Imports of wheat and flour, on the other hand, increased from $134 million to $164 million over the same period. The volume of wheat imports showed an even more striking growth--50 percent--from 1.4 million tons to 2.2 million tons over the same two periods. Agricultural imports, apart from wheat and flour, declined from about $90 million to $82 million as Brazil improved its own capacity to produce and process foods formerly imported and applied strict import controls to most food and feed items.

Coffee and other agricultural commodities will likely continue to dominate Brazil's exports for some time to come. Agricultural exports will probably continue to increase in amount but will decrease in importance as nonagricultural exports continue to make gains.

Agricultural imports probably will also increase, although import controls and import substitution will limit this growth largely to goods not available from Brazil's domestic production.

DIRECTION OF TRADE

Until recently, the United States has been Brazil's most important trading partner. In 1955-59 the United States took 46 percent of Brazil's exports and supplied 32 percent of imports (table 14). Western Europe, however, has recently overtaken the United States to become Brazil's most important trading area, taking 40 percent of 1960-64 exports and supplying 32 percent of imports. Brazil's trade with Latin America is comparatively small: This area (excluding Cuba) took only 7 percent of Brazil's exports and supplied 16 percent of imports in 1960-64. Except for oil imports from Venezuela, the bulk of this trade is with those nations comprising the Latin American Free Trade Association (LAFTA). The Communist countries, including Cuba, took 6 percent of Brazil's exports and provided 5 percent of its imports in this period. The rest of the world took 8 percent of Brazil's exports and supplied 14 percent of its imports.

Brazilian exports of agricultural commodities to most trade areas showed about the same trends as total exports, as would be expected, since agriculture comprises about 85 percent of total exports. However, agricultural commodities comprised less than half of total exports to Latin America in 1960-64, compared with about 60 percent in the earlier period.

Trends in agricultural imports were more varied, with the United States increasing its share from 20 percent to 45 percent of the total agricultural imports between 1955-59 and 1960-64. Latin America, on the other hand, dropped from supplying 60 percent of Brazil's agricultural imports to 33 percent. Western Europe's share also dropped from 15 percent to 9 percent of the total. The Communist countries increased their share of Brazil's agricultural imports from 2 percent to 7 percent, and the share supplied by the rest of the world rose from 3 percent to 5 percent. This shift appears to have been due to a decline in purchases of wheat from Argentina and of dried milk from Western Europe, compensated to a large extent by Food for Peace shipments from the United States.

Trade Regulations and Policy

Three protective purposes underlie Brazil's trade regulations and policies: Protection of domestic industry from foreign competition; protection of foreign exchange reserves; and protection of domestic supplies and domestic prices. Historically, exchange controls have played a greater role than tariffs in control of both exports and imports. Licenses and quotas have been more important in export control than in import control. Recently, efforts have been made to simplify and liberalize exporting and importing procedures.

EXPORT REGULATIONS

Export licenses are required for all exports and are granted subject to certain regulations designed to protect domestic consumption. When regional agricultural surpluses arise, traders may find it more economical to export surplus commodities than to ship them to deficit areas of Brazil. Lack of adequate forecasts and estimates of crop production and stocks, along with inflation, makes the future pattern of prices extremely difficult for traders to anticipate. To lessen speculation and local or temporary shortages the Government, through the Ministry of Agriculture and the Superintendency of Supply (SUNAB), restricts exports of food and agricultural raw materials to the amounts judged surplus to domestic needs.

Export quotas are announced seasonally. Licenses are generally granted to exporters on the basis of previous export history, with some provision made for new exporters, particularly when exports are expanding. The Government regulates the grades that may be shipped, the States that are permitted to export, and the quantities that each may ship. Such regulations generally apply to cotton and all foodstuffs. The Government may temporarily remove quotas in order to remove burdensome stocks if new crop prospects appear to be adequate. For many commodities, however, Brazilian prices are above world prices and import controls are in effect, making export controls unnecessary.

Exports of coffee are subject to special regulations of the Brazilian Coffee Institute (IBC). Such exports require the concurrence of the Government and must be in consonance with regulations of the International Coffee Agreement. The Sugar Institute (IAA) manages all sugar supplies and generally sets production quotas for cane milling based on its anticipation of domestic needs, export markets, and needed carryover levels.

Along with an export license, the exporter must have a shipping permit which certifies that he has arranged with an authorized bank to convert the resulting foreign exchange to Brazilian currency at rates fixed by the Bank of Brazil. The Government requires a major portion of foreign exchange receipts to be converted at the Bank of Brazil with a portion available to the exporter to pay selling costs or import needs arising from his business.

Exporters of coffee and, at times, other commodities have also been required to turn over to the Government as a tax a portion of exchange receipts called the "contribution quota." The amount has usually been fixed in relation to world commodity prices and domestic production costs. In the past, special export exchange rates accomplished a similar purpose. Multiple exchange rates could be adjusted to subsidize exports when domestic production costs were above world prices at regular rates of exchange. Under the current single exchange rate, this procedure cannot be used.

In 1965, when strong foreign demand for meat threatened to raise domestic meat prices, the Government held export quotas below the amount which exporters would have been willing to sell and, at the same time, levied an export tax to prevent undue profits on export sales. The proceeds of the tax were to be devoted to a fund for promoting livestock production. Similar funds have been set up to use Government export tax proceeds from coffee, sugar, cotton, cocoa, and perhaps other commodities.

To encourage the export of industrial goods, as well as processed agricultural commodities, export regulations permit the refund of import duties on that part of an import that is eventually reexported. An executive decree in 1966 set up the National Foreign Trade Council (CONCEX) to increase exports by simplifying procedures and to make Brazilian products more competitive in foreign markets.

IMPORT REGULATIONS

Import regulations have effectively prohibited bringing in agricultural commodities that would compete with domestic production or that are not considered essential to the domestic economy. Exchange and tariff regulations have supplemented each other in this regard and applied to both agricultural and nonagricultural items. Under former exchange and tariff regulations, commodities fell into one of two import categories--general or special. Commodities considered to be essential to the economy were listed in the general category, and all other commodities fell in the special category, where import costs ranged from high to prohibitive. However, during January 1966 through February 1967, exchange regulations were simplified and items in the special category were reportedly transferred to the general category as part of an effort to liberalize trade.

Exchange

In 1957, a considerable proportion of the protection accorded through the exchange system was shifted to the customs tariff, with simplification of both. However, a system of exchange controls gradually grew, which proved more restrictive than the tariff system.

For general and special category items, an importer had to have a Bank of Brazil "certificate of exchange cover" for customs clearance showing that he had an exchange contract with the Bank 30 days before acquiring the exchange, that he had made a prior deposit with the Bank equivalent to 50 percent of the contract amount (returnable in 120 days at no interest), and that he had paid a charge equivalent to 10 percent of the value of the transaction. Specified essential goods and imports from LAFTA countries were exempt from the prior deposit and charge. The importer also had to place a guarantee deposit of up to 100 percent of the value of the foreign exchange that could be applied to the cost of exchange purchase at the rate prevailing on the day of purchase. In addition, an importer of special category items had to buy through competitive bidding at public auction a "promise of license" at a cost which often exceeded the import cost--due to limited amounts of foreign exchange made available for this purpose.

In September 1966 this system was changed by abolishing the former complex requirement for the certificate of exchange cover. In addition, the reported transfer of all items in the special to the general tariff category does away with the need for a promise of license. With certain exceptions, 120-day exchange authorizations are freely issued under this new system and main reliance for the control of imports has apparently again shifted to the customs tariff. The transfer of special tariff items to the general tariff category could have the effect of halving the average duty for those items.

Tariffs

Brazil's tariff system adopted in 1957 put duties on an ad valorem basis with rates ranging up to 150 percent of c.i.f. value. In addition, surcharges amounted to 6 percent of c.i.f. value plus 10 percent of the net ocean freight. The tariff law also specified that duties could be raised an additional 30 percent for merchandise similar to that produced locally. Duty-free wheat imports of 750,000 tons per annum were negotiated under GATT. In addition, the Government established a duty-free quota to cover the deficit in domestic wheat requirements.

The average duty applied to actual agricultural imports is extremely light, due to the high proportion of duty-free wheat, but tariff rates and exchange costs on most other agricultural products are prohibitively high.

A recent study analyzed the effects of the 1957 tariff and the extra exchange costs paid on special category imports (21). The study was based on 1957-59 and extended to March 1962. It made no allowance for LAFTA concessions which, however, have been negligible on agricultural imports. Because no significant changes occurred in the tariff since 1962, the study is probably consistent with 1965 data, especially since it was unable to include the effects of the prior deposit system which had the most fluctuation--as much as 60 percent of the cost of goods imported (table 15). Table 15 also shows the protection afforded domestically processed food products.

According to this study, the average amount of the tariff paid on goods coming into Brazil does not show the full degree of protection afforded by the tariff schedule, since goods with a low duty enter in greater amounts than those with a higher duty. For example, unprocessed foodstuffs entering in 1957-59 paid an average rate of 1.1 percent of c.i.f. value; the average of rates of duty on such goods entering was 9.5 percent; and the average of tariffs on all unprocessed foodstuffs, including many that were not imported, was 43 percent. When costs of promises of license and customs clearance are included, the entry costs averaged 264 percent for 13 products.

In contrast, processed foodstuffs receive considerably greater protection, paying an average 50.5 percent tariff compared with the 1.1 percent paid on unprocessed foodstuffs. The average of rates paid on actual imports of processed foodstuffs amounted to 56.3 percent while the average of all goods in the category was 91 percent--more than double the 43 percent for unprocessed foods.

The Brazilian tariff system apparently will be substantially liberalized as a result of two Decree Laws passed in November 1966. Important changes include a revision of customs procedure and a new tariff schedule that took effect on March 1, 1967. The maximum tariff rate was reduced from 150 to 100 percent ad valorem. Reportedly, the rates for 1,700 tariff items were reduced an average of one-third, those for 380 items increased, and those for the remainder of 4,620 unchanged. Reported new rates for selected agricultural imports are: Breeding animals and certain planting materials, free; dry milk, 28 percent; fresh apples and pears and malt, 32 percent; wheat, 40 percent; and most other cereal grains, about 50 percent. Duty exemptions are provided for certain capital goods, public service materials, parts not available locally, reexport items, and certain imports by Government, quasi-government, and related agencies.

The full effect of these changes is not clear in view of their newness and other provisions which could counter the apparent reductions. Such provisions include the authority to change rates, to establish minimum dutiable values for imports, and to implement other compensatory mechanisms, such as specific in addition to ad valorem duties.

Trade Agreements

Brazil's trade agreements include membership in trading associations; international commodity agreements covering wheat, coffee, and sugar; and bilateral agreements affecting both exports and imports. Brazil was an original signer of the General Agreement on Tariffs and Trade (GATT). However, Brazil's tariff concessions under this Agreement are largely negated by exchange restrictions, permissible under GATT regulations.

Membership in LAFTA promises to be more significant for Brazil than membership in GATT. Although there was a decline from 1955-59 to 1960-64, Brazil's total trade with LAFTA partners has more than doubled since 1961; it totaled $301 million in 1964, 11 percent of total trade (table 14). The LAFTA agreement provides for the removal of tariff barriers between member nations over a period of 12 years to achieve free trade by 1973. Progress in this direction has been slow, particularly with regard to agricultural products.

For a number of years, Brazil has had an agreement to take 1 million tons of wheat annually from Argentina, an amount that was not always available. However, a renegotiated agreement signed in November 1964 provides for the import of 1 million tons annually through 1967 with the possibility of even larger markets for Argentine wheat, provided purchases of Brazilian goods increase.

Most trade agreements with Russia and East European countries specify that they import Brazilian coffee and other agricultural commodities; in return, Brazil takes petroleum and machinery. In April 1963, Brazil signed a new 5-year trade agreement with the Soviet Union, replacing the 1959 agreement. Brazil was to supply coffee, cotton, rice, oranges, cocoa, tobacco, sisal, and hides and skins, taking in return wheat, crude oil, manufactured products, and industrial raw materials. The wheat trade was to be 0.5 million tons in 1963, 0.6 million tons in 1964 and 0.7 million tons in 1965. However, failure of the Soviet wheat crop reduced the value of this agreement to both countries.

As a result of these agreements, Brazil's trade with Communist countries grew from $104 million in 1959 to $172 million in 1963, slipping slightly to $158 million in 1964. For 1961-64, Brazil developed a trade surplus of $53 million with the Communist Bloc. Brazil's exports to this area reached $95 million in 1963, compared with $72 to $76 million during the previous 3 years, but declined to $88 million in 1964. Imports from the Communist countries also declined in 1964, to $69 million; they had been $77 million in 1963 and, at their peak, $82 million in 1960. Of the total exports, 60 percent was coffee, 10 percent iron ore, and 25 percent sisal, cotton, and tobacco. Brazil's major agricultural import from the Communist countries was barley, including barley malt, valued at $2.4 million in 1963 and $2.1 million in 1964.

The strong showing of the United States in total agricultural imports has been due to the preponderance of shipments under P.L. 480. A large part of Brazil's wheat, vegetable oil, and dairy imports have come from the United States under Food for Peace agreements. The United States also provides quotas for the import of Brazilian cotton and sugar.

For the future, multilateral commodity agreements may become more significant in Brazil's total trade picture with the possibility of an international agreement on sugar and of strengthening the coffee agreement. Through LAFTA, Brazil is expected to increase bilateral agricultural trade with Argentina and may strengthen trade ties with other member countries. However, agricultural production of other LAFTA members is largely competitive with Brazilian farm output. Agricultural trade with Communist countries may show some gains.

GROWTH IN AGRICULTURAL PRODUCTION

The fivefold increase in Brazil's agricultural output between 1920 and 1960 was little more than proportional to inputs of land and labor. Slight yield increases were attributable largely to the higher fertility of new land in production. However, more public and private emphasis on fertilizer, mechanization, and other capital inputs was beginning to improve the productivity of labor and land. Research, technical assistance, and credit were changing centuries-old methods of production while more sophisticated Government policies were having a significant and immediate impact on levels of output. The response of Brazilian agriculture under largely traditional methods has been impressive; response to modern technology and economic incentives is expected to lead to even greater gains in output.

Agricultural Resources and Organization

For the country as a whole, an abundance of land and manpower and a minimum of capital are devoted to agriculture. Resources presently invested in agriculture amount to about 1 acre of cropland per capita. This is farmed at an average rate of about 22 acres per farm unit, using oxen or manpower, with only about 1 tractor for every 53 farms. Use of commercial fertilizers at about 9 pounds of active nutrients per cultivated acre averages about the same as for Mexico and one-third the rate of use in the United States. Average yields per acre are low by most standards, testifying to low land values. Potential agricultural resources in both land and manpower are significantly underdeveloped. Future development depends on new technology and application of existing technology through capital investment in land and equipment as well as in education, transportation, and the marketing system.

RESOURCES

Although Brazil is the largest tropical country in the world, most of its agricultural production is derived from a relatively small area in the temperate and subtropical regions to the south. The South, comprising 10 percent of the area of the country, produces over one-half the value of agricultural production. The South and East regions, together comprising only 25 percent of the national area, account for about three-fourths of farm income (table 16). Estimates of potentially arable land, which run as high as 80 percent of total land area under traditional labor-intensive cultivation practices, would be much less under sustained production using modern technology. Only about 3 percent of the total land area currently is under cultivation.

Over the past 400 years, most of the arable land in the 300-mile-wide coastal zone was cut over, cultivated, and returned to forest, perhaps several times. Much of the rest of the country has barely been penetrated for crop production; most of this expansion took place in the last decade. The potential area of production in the wet tropics is almost untouched, except for the narrow, well-watered coastal plain. Most of the eastern half of the country, including the Northeast, East, and South regions, consists of broad uplands. Hills and mountain ranges parallel the coast and make access to the interior more difficult. Annual rainfall is usually adequate for crop production except in the Northeast interior. However, irregularity of rainfall, providing alternatively drought and excessive rain and floods, is a general problem.

Brazil has three broad geographic areas: The humid forested Amazon Basin, which comprises mostly the North; the dry tropic uplands of the Northeast and East; and the subtropic and temperate mountains and plateaus of the Central West and South. Within these broad groupings are subareas which overlap State and regional boundaries, such as the Northeast drought polygon.

The well-watered State of Maranhao, the drought polygon States of Piaui, Ceara, Rio Grande do Norte, Paraiba, Pernambuco, and Alagoas, and the island territory of Fernando de Noronha comprise the Northeast region. The drought polygon takes in all but the coastal strip of these States, in addition to half of Sergipe, over half of Bahia, and about 10 percent of Minas Gerais from the East region. This area is thinly settled but overpopulated in terms of its present agricultural capacity. Rainfall averages about 20 to 40 inches a year, but distribution is highly irregular from year to year, and generally falls in a very few months, resulting in long periods of drought. Farm enterprises range from small cotton and subsistence farms to large sisal plantations and range cattle holdings.

In the Northeast and East, temperatures are uniformly (though not unusually) high, averaging 70° to 80°F. throughout the year. The natural cover is semideciduous forest, fairly dense in well-watered areas, becoming rain forest along the coastal plain and in some of the higher areas and deteriorating to a scrub brush cover in the drier areas of the Northeast. Seasonality is a matter of rainfall, with rain mainly in the summer, followed by winter drought which causes trees to lose their leaves. Natural grasslands are practically nonexistent. Agriculture is only possible after the land is cleared but fertility declines rapidly after clearing. Cultivation continues usually for only 3 to 5 years, although permanent plantings such as coffee and cocoa persist as long as 60 years in some cases, but usually less than half this time. After production becomes unprofitable, cropland is abandoned or planted to grass so that range or pasture becomes the dominant land use in the area.

In the Northeast region, population is concentrated along the coast where much of the best lands is in large sugar plantations. Inland, the area suffers from recurrent drought and units are generally too small or undercapitalized to provide a satisfactory income. About one-half of the land in the East and Northeast regions is in private holdings. Most of the land is too dry or steep for farming; some of it is too dry for ranching.

The East includes the States of Sergipe, Bahia, Minas Gerais, Espirito Santo, Rio de Janeiro, Guanabara, and the disputed territory of Serra dos Aimores. Towards the southern part of the Eastern region, rainfall and soils improve and farming is more prosperous. Bahia produces most of Brazil's cocoa and plantation rubber, and is a cattle fattening area for livestock moving out of the dry range areas. Espirito Santo and Rio de Janeiro are small States with general agriculture supplying the small city-state of Guanabara which consists almost completely of the former Federal capital of Rio de Janeiro. In southern Minas Gerais, a part of the so-called "Golden Triangle" which includes the cities of Belo Horizonte, Sao Paulo, and Rio de Janeiro, high urban demand has stimulated agriculture to reach comparatively efficient and technologically advanced levels of production.

The South consists of the States of Sao Paulo, Parana, Santa Catarina, and Rio Grande do Sul. The South and East regions include much of the best cropland in Brazil--gently rolling, well watered, and relatively convenient to transportation and population centers. Rainfall averages 40 to 80 inches per year, fairly evenly distributed in the southern two States, but coming largely in the summer in Sao Paulo and Minas Gerais. Seasonal temperature variations become more pronounced as one moves south. Even in the southern area, however, winter temperatures average over 50° F., while those in the summer average under 80° F. Rio Grande do Sul, Santa Catarina, and much of Parana are in the South Temperate Zone. Higher elevations in some of Sao Paulo enlarge the temperate production zone, but frosts rarely occur.

Sao Paulo was developed by the coffee boom which moved west through the State and into northern Parana. The slash-and-burn techniques of the East and Northeast continued in much of Brazil, but in Sao Paulo the disappearance of the frontier, the relatively deep and arable soils, the proximity to population centers, and a reasonably good transportation system combined to bring some degree of permanence to farming and the beginning of technically oriented commercial crop production.

Seventy-three percent of the South region is in private land holdings; crops account for 22 percent of the total farmland and pastures for 50 percent. Towards the extreme south, the terrain is less mountainous and more suitable for sustained cultivation. Natural grasslands in Rio Grande do Sul are used for range or crop cultivation. Adequate year-round rainfall and temperate climate have favored a stable agriculture and sustained cultivation.

The western frontier currently centers on the Upper Parana River basin in the States of Parana, Goias, and Mato Grosso. The latter two States, which together with the Distrito Federal comprise the Central West, also contain the southern part of the Amazon Basin and the northern Paraguay River basin. A considerable portion of the latter is low and swampy during the rainy season. Rainfall in this area averages 50-60 inches, falling mainly in the six summer months. Temperatures are uniformly high, averaging between 70° and 80°F. Some good cropland and much extensive rangeland may offer good possibilities for development. At present, cattle have to be driven many hundred miles to market and grazing is limited by the seasonality of grass growth and lack of provision for dry-season forage. The Central West contains much land for development; only one-third was in private holdings in 1960 and much of this was unused. The opening of a bridge and highway across the Parana River is expected to reduce marketing costs and favorably affect the economy of the region.

The North, which consists of the broad Amazon River basin with its alluvial flood plains and deltas, covers 42 percent of the country. However, most of this region is deep in the interior and largely inaccessible. It includes the States of Acre, Amazonas, and Para, and the territories of Rondonia, Roraima, and Amapa. Apart from a few high-valued and relatively nonperishable commodities such as jute, rubber, tropical woods, and Brazil nuts, it has little except subsistence crop production, and is a food deficit area except for rice and meat. About 9 percent is in private holdings of which less than 1 percent is in crops. Generally, rainfall ranges from 60-120 inches; excess of rain during the summer causes extensive flooding, intensified by the overall low elevation of the country. Most of the region is less than 1,000 feet above sea level, even 2,000 miles upriver.

In the Amazon plains, high temperature and humidity, a heavy forest cover, and general inaccessibility almost preclude agricultural development. Some cattle are raised in the Guiana highlands to the north and on the island of Marajo at the mouth of the Amazon. The State of Maranhao, while usually included in the Northeast region, is in many ways typical of the Northern region and is sometimes referred to as the Middle North.

While Brazil has large areas of arable soils for potential agricultural development, the bulk of the untilled area is basically of low fertility. The latosolic soils available for expansion in Brazil are generally considered as only "fairly favorable" (32).

In general classification, the great bulk of Brazil's soils are tropical latosols divided about equally between the wet dry latosols of the interior highlands and continuously moist latosols of the Amazon basin and coastal areas. The soils of the Northeast drought polygon are classed as noncalcic brown or red desert soils. Part of Mato Grosso in the Central West and much of the temperate zone of the South consist of rubrozems, with grumosols associated with these soils in the South. Interspersed with the wet dry latosols and the rubrozems are red-yellow podzolic soils with basically higher fertility than the latosols but lower than the rubrozems. Relatively large areas of alluvial soils are present in the Amazon delta, the pantanal of the Paraguay River basin, parts of Rio Grande do Sul, and scattered along river valleys throughout the country.

Latosols are mainly red or yellow, highly leached, and low in plant nutrients. Although often rich in clay, they have a low nutrient holding and a high phosphate fixing capacity. Research and experience indicate, however, that under excellent management the productive potential of some latosols in Brazil is high, especially when protective cover is maintained.

The podzolic soils are much like the latosols--low in plant nutrients but higher in nutrient holding capacity and more susceptible to erosion.

The noncalcic brown and red desert soils are high or moderately high in many plant nutrients but low in organic matter and hence low in nitrogen. If irrigated, productivity is likely to be high but phosphorus and nitrogen fertilizers are needed.

Rubrozems are fairly high in nutrients and reasonably productive and are classed as moderately favorable. Grumosols, principally clays which predominate in southernmost Brazil in association with rubrozems, are hard to manage and are used principally for pasture. Alluvial soils are generally more fertile but frequently are subject to flooding which limits their usefulness. They are ranked with the most favorable soils.

Much more research is needed into the fertility and management of Brazilian soils in order to achieve their productive potential. This relates especially to expanding the cultivated area through bringing the unused latosols into production. However, continuous cropping of the latosols without proper regard to their maintenance may lead to a rapid drop in fertility, erosion, and subsequent abandonment.

ORGANIZATION

The organization of Brazilian agricultural production is characterized by its pattern of land tenure, use of labor, and capital inputs. Traditional systems generally prevail in all three areas but are gradually eroding as agricultural development accelerates.

Land tenure.--The structure of Brazilian agriculture consists of a system of subsistence holdings farmed by owners, tenants, sharecroppers, and squatters superimposed on a framework of large landholdings called "fazendas" operated by managers. Thirty-one percent of the total area of the country is privately owned and nearly half of this is in holdings of 1,000 hectares and over which are largely uncultivated. However, the pattern of development in the South, particularly in the temperate zone of Rio Grande do Sul and Santa Catarina, was somewhat different and family-size commercial farms are more general.

A large fazenda is a self-contained community which may include a school, a church, and recreational facilities. On such coffee fazendas, the worker and his family usually contract to raise a stipulated number of coffee trees to bearing age at a fixed price, which requires between 80 and 100 days a year. During the remainder of the year, the worker may do other work for the owner. Seasonal workers come from among farmers owning their own land, migrant farmworkers, sharecroppers, and squatters. Other types of fazendas may have varying tenure arrangements.

Ninety percent of Brazil's farm units, however, are less than 100 hectares in size and comprise 58 percent of cultivated land (table 17). Half these farms have less than 10 hectares and average about 4 hectares, of which two-thirds is cultivated. Yield levels are low, and this size of farm provides very little more than the food requirements of the farm family.

Since 1940, total land in farms increased by only one-third while the number of farms and land in cultivation increased by two-thirds (table 18). Land in small holdings increased most rapidly; in all groups except the largest, the average size of holding decreased.

Labor.--Agricultural labor, including unpaid family labor, accounted for 52 percent of Brazil's total labor force of 22.6 million persons recorded in the 1960 census, compared with 58 percent in 1950. In 1950, owners and their families (largely subsistence farmers) comprised 45 percent of the agricultural labor force; 10 percent were renters, administrators, and tenants; 34 percent were wage earners, of whom two-thirds were employed on a temporary or seasonal basis; and 11 percent were sharecroppers. A substantial increase in the proportion of subsistence farmers since 1950 is expected to show a decrease in the overall importance of hired labor in 1960. The increased number of small farms has reduced the average size of farm and number of persons employed per farm. Employment averaged 4.8 persons per farm in 1950 and 3.5 in 1960.

The rapid rate of increase in cultivated area is expected to continue, aided by the expanding road network, population pressures in settled areas, and Government efforts at resettlement. The unbalanced tenure structure of many small and few large farms will continue to restrict the flexibility of changes in production.

Agricultural labor showed some increase in efficiency during 1950-60. In 1960, one person employed in agriculture provided food for 6.1 other people in the economy, compared to 5.2 in 1950. Cultivated area per farm declined steadily from 9.2 hectares in 1940 to 8.9 in 1960 but cropland per person employed in agriculture increased from 1.9 hectares per person in 1940 to 2.6 per person in 1960. The latter increase may reflect some increase in mechanization as well as a lower rate of growth in livestock production than in crop production.

Wages accounted for 50 percent of farm costs reported in the 1950 census, in spite of a generally low level of farm wages. On the surface, labor legislation appears to be quite favorable to rural labor; enforcement of the labor code for rural workers, however, has been extremely lax. Salaried rural laborers were granted a legal minimum wage in 1943, which was reaffirmed in March 1963, but which has not been implemented for most farmworkers. A November 1963 statute extended social security to rural laborers. A surplus of rural labor particularly in depressed agricultural areas encourages the evasion of legal obligations.

Many provisions of the labor code do not apply to occasional workers, sharecroppers, tenants, other temporary workers, and small holders. These have been the most active groups in the rural union movement. Since 1960, rural unionization has made some progress through the organization of several hundred unions, particularly among the depressed Northeast sugarcane workers. In June 1964 were farm laborers granted the legal right to strike. The Agrarian Reform Law has taken jurisdiction over all forms of farm tenure and should eventually improve the status of the nonsalaried farm laborer. Colonization of new lands, demand for farm labor in frontier regions, and increased industry in rural areas may also assist in relieving the pressure on the land of wage earners, sharecroppers, and small holders.

Capital inputs.--Data from the 1960 census on the capital structure of Brazilian agriculture are not yet available. The 1950 census, while dated, shows that capital inputs were minimal; operators reported total expenses of 15 billion cruzeiros ($750 million)--equal to 20 percent of the value of 1950 agricultural production. Wages accounted for half the total expense; rent and taxes, 9 percent; seed, fertilizer, and insecticides, 9 percent; and other expenses, 32 percent.

Regional differences in the response of farm output to input factors are not sufficiently refined for close analysis but do suggest a potentially high rate of return to capital; return per unit of land and labor was greater in areas of higher capital inputs and return per unit of capital was lower (table 19). The higher capacity of southern labor and land to use capital may account for some of the regional differences. Differing crops, soils, climates, and markets also favor the southern region.

Mechanization had relatively little impact on farm output. Only 1 farm in 53 reported a tractor in 1960; even among the nearly 350,000 farms of over 100 hectares, less than 1 farm in 5 had a tractor. The small number of tractors, the many makes and models from a number of exporting countries, and the difficult exchange situation made tractor maintenance slow and costly; many farm tractors were not in working condition.

A domestic tractor industry started in 1960 with 37 tractors has increased turnout to 7,586 in 1962, 9,908 in 1963, 11,534 in 1964, and 10,804 in 1965. The import of wheel-type tractors is practically prohibited. With these trends it will be many years before mechanization will replace a significant portion of the labor engaged in agriculture.

Not only is Brazil short of tractors, but animal power and tillage equipment also are limited. Only one farm in three reported a plow in the 1960 census. Even the 1.8 million farms of 10 hectares and over reported only 1 million plows, and probably most of these were primitive plows with wooden plowshares. Farmers without plows usually have no ox, mule, or horse (at most a donkey) and depend largely on manpower for cultivation, with the hoe, the machete, the pointed stick, and fire.

Motor vehicle production by 9 firms has also increased rapidly, from about 31,000 units in 1957 to more than 200,000 in 1963. About one-half of the output is passenger cars and one-half commercial vehicles. Nine firms are producing.

Expenses for seed, fertilizer, and insecticides in 1960 greatly exceeded the 9 percent of total farm expense for these items in 1950. Between 1950 and 1960, fertilizer use more than tripled; use of improved seeds, particularly hybrid corn seed and improved varieties of cotton, also increased. Data on insecticide use are not available but consumption has reportedly increased substantially.

An estimated 90 percent of fertilizer use is on a relatively small area of the four southern States and is concentrated on a limited number of commercial crops--rice, corn, cotton, sugarcane, and tobacco. Yield responses to fertilizer normally are good. According to local experts, a chief reason for the low rate of use is the lack of technical guidance to farmers. Very little experimental work has been done as a basis for recommendations. High transportation costs also limit the area over which fertilizer use is economic. The high cost of fertilizer combined with low crop prices requires careful use in order to provide economic returns on the investment. Primitive farming methods and lack of cash and credit also inhibit its use.

Attempts to encourage both domestic fertilizer production and fertilizer use resulted in both tariffs and subsidies. At times, tariffs and high prices discouraged fertilizer use. At other times, subsidies or favorable exchange rates encouraged imports with consequent accumulation of stocks to be consumed in subsequent years. Such was the case in 1960. More recently, fertilizer imports gained at the expense of domestic output. In 1966, duty-free imports of set quantities were permitted, provided that specified amounts of domestic fertilizer were purchased.

Apparent consumption (production plus imports) of 307,000 tons of nutrients in 1963 was more than triple that for 1950, but the amount in use is still extremely low (table 20). Production increased steadily from 7,000 tons of nutrients in 1950 to 93,000 in 1960, then declined abruptly to 58,000 tons in 1963 with further decline estimated for 1964 and 1965. Imports increased by a somewhat larger amount, though at a lower rate, from 82,000 tons in 1950 to 211,000 tons in 1960, and to 249,000 in 1963 with further increases indicated for 1964 and 1965. Local projections of fertilizer demand range from 675,000 to 1,200,000 in 1970, with local output of from 484,000 to 534,000 tons. However, this increased demand will probably still be far short of real needs at that time.

Greatest increases in local output are expected in synthetic nitrogenous fertilizers, followed by phosphates. Potash supplies will continue to be supplied mainly by imports, unless recent discoveries in Sergipe prove to be of commercial importance.

Soil acidity is a problem seriously inhibiting the uptake of nutrients available in Brazilian soils. Except for the arid Northeast region, cultivated soils are distinctly acid in character with the pH value running between 4.5-5.9 on a majority of soil tests in Sao Paulo and Rio Grande do Sul. A similar situation is probable in many other States (1). On the generally underdeveloped "campo cerrado" lands of Sao Paulo, Minas Gerais, and Goias, limestone is a prerequisite for successful cropping. In addition to raising the pH, it supplies micronutrients otherwise lacking. Production of limestone reportedly was 211,000 tons in 1961-63 compared with an estimated annual need of nearly 4 million tons. Local sources of limestone are generally adequate and fairly well distributed, except for Rio Grande do Sul, Santa Catarina, Parana, and western Sao Paulo.

Irrigation makes a comparatively small contribution to total agricultural output. No more than a million hectares (3 percent) of Brazil's cultivated area is irrigated. Except in the Northeast, production areas generally receive sufficient moisture to produce a crop. In areas where two crops are grown during the season, supplemental irrigation during the dry winter months often increases yields of rice, potatoes, and other crops.

In Rio Grande do Sul, rice is irrigated from small reservoirs, by pumping from streams, or simply by the use of winter flood water. Rice also is irrigated in the Paraiba River Valley of Sao Paulo, in parts of Minas Gerais and Rio de Janeiro, and along the river flood plains of Maranhao and Parana. There are, however, few reservoirs, canals, drains, or other works built and maintained at public expense except in the Northeast. Public power and irrigation projects have so far done little to increase the amount of land under irrigation.

Irrigation in the dry Northeast is hampered by the high cost of constructing storage dams and delivery systems and by wide fluctuations in rainfall. Many river systems do not regularly receive enough water to provide reliable irrigation. Some land on river flood plains in the Northeast is effectively subirrigated by planting right up to the water's edge as the stream flow drops through the dry season. Such plantings, however, run the risk of flooding from late rains.

The high cost of irrigation works and the relative abundance of land with adequate rainfall will limit the investment in irrigation facilities in Brazil. Increased use of sprinkler irrigation during the dry season in the more intensive commercial farm areas may be expected, however.

The problem of supplying range cattle with forage and water during the dry season is more acute than the need for irrigation. Wells, water holes, and small dams are used but a much greater investment in these is needed to take care of expanding cattle herds and to avoid serious death losses during recurrent prolonged drought.

Acceleration in the rate of capital expenditures in agriculture can be expected to continue in Brazil. Increased plant nutrients are needed simply to prevent further deterioration of yield levels on impoverished soils. Other improved practices--such as the use of more insecticides, better varieties, and better cultivation and harvesting methods--are needed to produce the full benefit from fertilizer application. Together, improved technology and capital investment are expected to provide considerable yield increases for certain crops on commercial farms leading to an uptrend in overall yield indices.

Production Trends

The measure and accuracy of Brazilian agricultural output trends are limited by serious statistical problems. The statistical basis for such output trends indicates their limitations.

STATISTICAL BASIS

Brazil's main crop seasons are generally the reverse of those in the United States, with plantings principally in October and November and harvests in April and May. The production seasons are complicated, however, by variations from north to south and from crop to crop, and by the harvest of two crops of some commodities in the more favorably situated areas. Thus, both harvesting and planting are going on somewhere in the country throughout the year. Generally, crop production estimates are based on the calendar year of harvest. Harvests which span the change in year are included with the year in which most of the harvest usually takes place.

Municipal, State, and Federal agricultural statistics are available for a wide range of commodities. Production estimates originate in municipal offices of the Brazilian Institute of Geography and Statistics (IBGE) and, to a large extent, are based on opinion. State and Federal estimates represent a summation of municipal estimates and are prepared by the Department of Economics (DE) of the Ministry of Agriculture. In the past, little or no attempt was made to coordinate with other data on a State and national basis. Estimates have not been reconciled with census data nor have they been coordinated with separate state statistical programs and other estimates, including those of commodity groups.

DE is attempting to correct some of the past deficiencies. In 1965, DE made its first forecast of agricultural production based on surveys conducted during the growing season. It plans to expand this work and expects to develop financial arrangements with the States to coordinate programs on agricultural statistics. In addition to the official series of estimates, certain commodity institutes such as the coffee, rice, and sugar institutes, make their own forecasts and estimates of production.

The Foreign Agricultural Service (FAS) and the Economic Research Service (ERS) of the U.S. Department of Agriculture (USDA), in compiling world totals of agricultural production, maintain certain differences from official Brazilian estimates. USDA also forecasts production well ahead of available official statistics, using crop and marketing years that more nearly fit Northern Hemisphere production. Where commercial channels handle the bulk of production, estimates are usually based on these sources; when little other data are available, official Brazilian estimates are generally used.

Brazil has conducted decennial censuses since 1940 and periodic censuses prior to that time. The accuracy and completeness of census data are not clearly known. Crop production data for the 1950 census became available in 1955. However, only limited data from the 1960 census have been published. According to the most recent censuses, the total area in crops increased by 56 percent between 1950 and 1960, somewhat more than the 45 percent indicated by DE (table 21). Changes of this magnitude strain any estimating method. Also, when examined on a State and regional basis, the wide disparity between DE and census totals and rates of growth cast doubt on the validity of both production series. Although DE reports are for December 31 and census reports were for July 1 for the 1950 census and September 1 for the 1960 census, this accounts for a very minor part of the discrepancy. For instance, depending on whether census or DE estimates are used, the cultivation in Parana increased between 1950 and 1960 by either 2.1 or 1.7 million hectares (156 or 114 percent); in Bahia by 0.9 or 0.6 million hectares both (65 percent); in the Northeast by 3.1 or 1.9 million hectares (82 or 55 percent). Also, according to the 1960 census, cattle numbers over the same period advanced much less than the DE estimates.

TOTAL OUTPUT TRENDS

Total agricultural output has made large and generally steady gains since before World War II (table 22). In the 25 years, 1935-39 to 1960-64, agricultural output increased from an index of 53 to 109 (a compound rate of 2.9 percent, a slightly faster rate than the population increase of 2.6 percent). Within this period, total output declined at a rate of 1.4 percent from 1935-39 to 1940-44; increased at 4.3 percent from 1940-44 to 1950-54; and showed a gain of 3.7 percent from 1950-54 to 1960-64. In 1960-65, production increased at the surprisingly rapid rate of 5.3 percent compared to 3.1 percent for population. However, preliminary estimates for 1966 indicate that production was down largely due to unfavorable weather and an off-year coffee cycle.

Food production has shown even more rapid gains indicating the strong response to steadily increasing needs. For the same 25-year period, the rate of gain was 3.8 percent or a net of 1.2 percent over population growth. Within this quarter-century the rate of increase jumped from 1.2 percent in 1935-39 to 1940-44 to 4.5 percent for 1950-54 to 1960-64. Food output reached an even higher rate of increase of 5.5 percent in 1960-65, 1.8 times the rate of population growth. Food output was also estimated to be down in 1966 but not as much as total output.

Increases over the 25-year period have resulted almost equally from crops and livestock products. In the present decade, crop output has gained much more rapidly than has livestock.

CROP TRENDS

Crop output increased from an index of 60 in 1935-39 to 113 in 1960-64, a compound annual rate of growth of 2.6 percent which matched population growth. Comparable rates were 3.5 percent for field crops and 0.5 percent for tree and vine crops. In the 1960's the rate for crop output increased to 5.7 percent through 1965 with field crops accounting for the gain. Crops included in this USDA index account for about 90 percent of the total cropland, based on DE estimates, and about 80 percent based on census estimates. However, multiple cropping reduces this percentage somewhat.

For the quarter-century under review, almost 95 percent of the increase in field crop output resulted from an increase in the area under cultivation. With an annual output gain of 3.5 percent, the rate for area was 3.3 percent and that for yields, 0.2 percent. The overall yield trend in the present decade is inconclusive with some evidence of an increase over that of the past.

A comparison of DE area and production trends may have some value as an indicator even though the area estimates may be low, compared with estimates from the agricultural census. For most crops, production apparently increased a little faster than acreage over the decade, indicating somewhat higher yields in 1960 than in 1950 (table 23). The area devoted to principal crops increased 46 percent, compared with the DE estimate of total crop area of 45 percent and the census estimate of 56 percent; this may indicate that the DE estimates are low. Also, the 1960 area for principal crops was 102 percent of the area estimate and 88 percent of the census estimate. With the large but incomplete coverage represented by the principal crops included in the comparison and the reported significant degree of intercropping in Brazil, this indicates that DE estimates of total crop area may also be low and that of the census high. Unfortunately, the general unreliability of crop data and the lack of accurate information on intercropping preclude a better judgment on total crop area. Crops included in this comparison represent a somewhat larger sample than that used in the USDA production indices.

The rapid expansion of crop acreage on relatively fertile virgin soils and increased plantings of cotton, sugar, and other crops in the higher yielding South may have accounted for the maintenance and slight increase in yields as much as improved technology. Also, some relatively good land, retired from coffee production in Sao Paulo as coffee moved onto new land, became available for field crop production. The problem of sustaining and increasing current yields under systems of permanent cultivation is a major concern in planning for future food needs. This is especially true as cropping moves to the Central West and to the Amazon basin where, except for scattered good soils in river valleys and flood plains, soils are basically poorer in structure, soil nutrients, and nutritive holding capacity than the average of soils now in use in Brazil.

LIVESTOCK PRODUCTION TRENDS

The output of livestock products increased at a slightly more rapid rate than crop production in the period 1935-39 to 1960-64. Livestock production increased from an index of 56 to 109 in this period or at a compound rate of 2.7 percent, slightly faster than population growth. In the present decade the rate of increase has been 3.5 percent through 1965, an increase over the earlier period and well above population growth of 3.1 percent.

The USDA index of livestock output includes only red meat, milk, and wool production. A complete index, including other products and an allowance for the increased numbers of livestock, might show a somewhat different result. However, data limitations prevent calculation of such an overall index. Improved breeding, feeding, and management has taken place, particularly in Sao Paulo. Trends toward increased output per head, discernible on a national basis, pointed to heavier slaughter weights for cattle and hogs. Egg production was up an estimated 91 percent and milk up 102 percent from 1950 to 1960, but red meat output gained only 29 percent (table 24).

In addition to the estimating problems discussed earlier, livestock statistics are internally inconsistent. Biological rates of growth and reproduction limit meat output and changes in numbers on hand.

According to official estimates, cattle numbers on hand December 31 increased 40 percent between 1950 and 1960, from 52.6 million to 74.0 million, while the 1960 census showed only a 19 percent increase from 46.9 million to 55.7 million head (table 25). Over the same period, reported slaughter increased 21 percent from 6.0 million to 7.2 million head (table 26). Both numbers slaughtered and herd numbers reportedly increased in some years and decreased in others. Estimates show rapidly increasing herd numbers from 1950 to 1954, raising the annual offtake ratio from 12.8 percent of numbers on hand to 16.0 percent. Slaughter data failed to support these estimates, however, and offtake ratios fell to an apparent low of 9.9 percent in 1963.

Assuming that slaughter data were reasonably correct and consistent from year to year, December 31, 1963, cattle numbers seemed nearer 67 million head than the official estimate of 79.8 million. Hog numbers also may be high. Reportedly, hog slaughter increased only 31 percent, to 7.1 million head in this period (table 27). Sheep numbers and slaughter show little fluctuation and slower trends but similar wide fluctuations in indicated offtake ratios (table 28).

Apparently uptrends in animal numbers are real but generally overstated. Uptrends are expected to continue and to be joined by increasing slaughter rates. Improvements in breeds, feeding, and management practices should lead to gradually shorter growing periods and heavier slaughter weights bringing about some improvement in actual offtake ratios. Actual trends will continue to be clouded by statistical inconsistencies in data.

Production Policies and Programs

Brazil's agricultural policy has been characterized by duplication and conflicting interests on the part of the great number of Federal, State, regional, and commodity groups involved. In the past, planning was largely uncoordinated with no longrange policy for agriculture. The Ministry of Agriculture has held a relatively weak position, sharing responsibility with other ministries and new agencies formed to handle specific problems arising from the rapid economic growth rate and population shifts. Numerous reorganizations have attempted to improve the structure of the Ministry and to cope with the basic lack of information needed for firm policy decisions.

The Ministry of Planning and Coordination, instituted under the Branco Administration, has sought to come to grips with agricultural policy problems and has brought about decisions at higher operating levels. With reorganization accomplished and underway, a more rational approach to agricultural development in terms of longrun goals is promised.

Two basic goals which have changed very little in the last decade underlie most of Brazil's agricultural program: To improve and protect local food and industrial needs, and to increase agricultural exports. By the very nature of these goals, however, program responsibility for agricultural affairs will continue to be shared outside the Ministry of Agriculture. The program itself is built on three approaches: Price incentives, credit, and technical assistance. The Ministry of Finance and The Central Bank are largely responsible for determining price and credit policy and programs. The Ministry of Agriculture is responsible mainly for regulation and technical assistance. The National Superintendency of Supplies (SUNAB), with the responsibility for price supports and guaranteeing adequate food supplies, has possibly equal weight in determining agricultural policy.

Probably the outstanding characteristic of Brazilian agricultural organization is the existence of numerous semiautonomous commodity institutes responsible for the orderly marketing of coffee, sugar, rice, and other commodities. The institutes make major commodity decisions in conjunction with the Ministry of Economy and contribute to the continuation of the monocultural system in many sections of the country. They include the Brazilian Coffee Institute, Institute of Sugar and Alcohol, Bahian Cocoa Institute, the now defunct Wheat Expansion Service, Bahian Tobacco Institute, Sisal Institute, Rice Institute of Rio Grande do Sul, Federation of Wool Growers, Rio Grande Meat Institute, Institute of Mate (yerba mate), Institute of Fermentation (wines), and others. Further reference to these organizations will be found in the commodity section. Semiautonomous regional development agencies also have authority in the area of agricultural development overlapping government and other organizational lines.

The Ministry of Agriculture carries on research, education, extension, market and statistical studies, and other matters connected with crops, livestock, and forestry. The Ministry is also responsible for meteorology, fish and wildlife, and the Indian Protection Service. The Ministry has been limited in its activity by small budget appropriations and by considerable shifting of those in policy-making positions.

While the level and extent of research into agricultural production is low in terms of both the need and the production potential, considerable effort has been made along these lines. The Federal Ministry of Agriculture has agronomic institutes in each of the five regions, and an additional institute in the East at the Rural University of Brazil in Rio de Janeiro. Together the 6 institutes operate 26 experimental substations for research into varieties, fertility, herbicides, and general production practices. In addition the major agricultural states operate 65 or more experiment stations and substations. Experiment stations are also managed by the Coffee, Cocoa, Sugar, and Rice Institutes. This network of research stations covers the country and has produced some outstanding results. However, reports indicate some overlapping in work, inadequate contact with research outside Brazil, and a lack of proper and continuing financial support.

SUNAB, constituted in late 1962 from several existing agencies, is responsible for assuring an adequate supply of domestic food and raw material. It is authorized to accumulate stocks, to import, and to establish farm, wholesale, and retail prices for milk, meat, cotton, vegetable oils, grains, grain products, and other commodities. SUNAB also has technical supervision over several autonomous institutes and commissions having to do with food supplies. The Brazilian Storage Company, formed under SUNAB, plans a complete network of warehouses. Much of the available storage capacity is not being used even though crops are being lost because of lack of shelter.

Export and import policy for agricultural products is fixed largely by the Ministry of Finance and implemented by the Bank of Brazil. When trade involves products that might be in short domestic supply, the Federal Price and Supply Commission (COFAP) of SUNAB must also approve the policy. The minimum price and government commodity purchase program comes under COFAP, limited by funds provided by the Ministry of Finance, except for wheat, coffee, cocoa, and sugar which are included in separate price programs. Agricultural credit policy is determined in great part by The Central Bank, except for credit cooperatives where the Cooperative Bank is the administering agency.

Under the Ministry of Planning and Coordination considerable progress has been made in interagency approaches to policy questions affecting production and trade in the major commodities. While dispersion of program authority will continue to be a problem, the establishment of national policy goals will be a decided advantage to the progress in agriculture.

PRICE POLICIES

Support prices have traditionally covered most of the basic food and commercial crops. Wheat and cotton have been covered under mandatory minimum producer prices for domestic purchasers. Under commodity institutes, price programs have been carried out for coffee, cocoa, jute, sisal, rubber, and other commodities.

Beginning in 1964, the Government established a new system of minimum producer prices covering most farm commodities. Principal changes included coverage, operation of the program, early announcement of prices and subsequent increases, and attempts to provide greater producer incentives through higher price levels. The minimum price program has also been supplemented by price controls, particularly for livestock products.

Minimum prices under the new system are usually established for rice, beans, corn, peanuts, soybeans, sunflowerseed, wheat, mandioca, mate, sisal, jute, malva, and cotton. Prices are maintained through nonrecourse loans, except for wheat and cotton, and support programs are operated for coffee, cocoa, and sugar through commodity associations.

Minimum prices for loan commodities are assured producers by the Production Financing Commission (CFP) of the Ministry of Finance which, through the Bank of Brazil and COFAP, assures loans to producers or the purchase of their commodities. Until 1964, in order to sell (or obtain a loan) the interested party had to deposit his produce in an approved warehouse, the merchandise had to be classified, cleaned, put in new sacks, and marked with the required identifications. Under the new system, loans were made for up to 80 percent, and later increased to 100 percent of the price of goods delivered to interior points. Charges, including classification, warehousing, insurance, cleaning, and estimated charges for buying and hauling to terminal ports, are deducted from terminal prices in order to reach country support levels. Loans are for 60 days. Upon maturity the debtor can either repay the loan or hand over the merchandise and receive payment equivalent to the additional 20 percent.

While minimum prices are established on wheat, the Bank of Brazil does not acquire control over wheat. Mills are required to purchase domestic wheat at the minimum price in order to be eligible for imported wheat. In addition, growers receive a bonus to cover transportation costs when wheat is delivered to coastal ports. Under the new system, the domestic support price was established at the cost of imported wheat, unsubsidized since 1963, until 1966 when it was increased sharply. The Government does not purchase cotton but requires the cotton trade to pay minimum prices.

The Rice Institute of Rio Grande do Sul (IRGA) buys rice in Rio Grande do Sul at established minimum prices. IRGA maintains stocks in Rio Grande do Sul as well as in consuming centers but most rice IRGA handles is stored on the farm.

The new system of announcing support prices before planting, with the proviso that prior-to-harvest support levels would be updated to account for monetary depreciation, has not been completely adopted. Support prices are intended to encourage production without developing unexportable surpluses and to provide a balance between production and demand at prices competitive with world price levels. Support prices for rice in 1965 were already above competitive export prices and could not be raised without increasing domestic surpluses.

Efforts to provide greater incentives to producers through higher price levels have met with mixed success and encountered several problems, including implementation difficulties, shortages of funds, pressures to keep export commodities competitive, and the need to maintain food prices at reasonable levels to lessen inflation and the spiraling cost of living. Since SUNAB took over price support responsibility in 1962, prices for farm products have generally declined relative to the general wholesale price index as indicated by minimum prices for selected commodities (table 29). Since that time, higher prices were established in 1963-64 than 1965-66, with an upswing indicated for 1967. Also, relatively higher prices were set for oilseeds and livestock products than for other commodities. Efforts to increase wheat production were reflected in the higher price in 1966. However, reports indicate that the new program starting in 1964 has been more effective in terms of the number of farmers benefitting which has tended to counter lower price levels. In earlier years, established support prices tended to be less effective and more of a "paper program" as the result of fewer funds available and more limited access by farmers due to delivery requirements and other program limitations.

Recent changes in the support program, including prices announced farther in advance with the provision for monetary correction and the acceptance of delivery from farmers at interior points, have apparently encouraged greater production. An easing of the tight credit imposed to halt inflation plus general improvement in the availability of rural credit promises to further increase crop production. However, continuing problems were evidenced in effecting the needed expansion of both the new price support and credit policies in 1966.

CREDIT

Additional credit is necessary to speed technological progress in Brazilian agriculture. Chronic inflation has discouraged lending, depleted the capital stock of Government lending institutions, and resulted in a scarcity even of short-term high interest loans for agriculture.

The Bank of Brazil, which handles 90 percent of institutional rural credit, has tended to concentrate loans on large farms where losses and costs of supervision are relatively small. Of the total Bank of Brazil credit to agriculture in 1963 of 194 billion cruzeiros (about $310 million), 62 percent went to short-term crop financing, about 16 percent to finance purchases of equipment and work stock, 9 percent to finance improvements or permanent plantings, 6 percent for breeding stock, and 7 percent for various other purposes. Crops receiving the greatest credit support were: Rice, 36 percent; cotton, 14 percent; corn, 16 percent; and coffee, 8 percent.

The Brazilian Association of Rural Credit and Assistance (ABCAR) has provided supervised credit to small farmers. ABCAR provides planning and management assistance along with credit and has the best trained manpower in the field of agricultural credit. The local moneylender, however, is the primary source of credit for small farmers.

A new organization of agricultural credit resulted from recommendations of study groups. In 1964, commercial banks were allowed to charge agricultural loans against their reserve requirements with the Bank of Brazil in an effort to increase agricultural credit. In September 1965, policy responsibility for rural credit was transferred to the new Central Bank and the Government's agricultural loan funds were incorporated into the General Fund for Agriculture and Industry under the Bank of Brazil.

Funds derived from the Government's coffee export program were used for credit to coffee growers to encourage diversification. In 1962, coffee growers were provided loans equal to 15 cruzeiros (about 20 cents) per tree to eradicate unprofitable coffee trees. The loan was repayable only if the grower replanted coffee. The goal was to eradicate 2 billion coffee trees and free 2 million hectares for production of other crops. In the first 2 years of the program, only 701 million coffee trees were eradicated. Inflation reduced the subsidy of 15 cruzeiros per tree to an insignificant level while higher world prices, though no higher domestic prices, encouraged producers to maintain coffee production levels. Loans under the program were also used to finance rural electrification, sugar mills, dairy plants, and research in agronomy, industrial technology, and market information. A commission composed of the Ministers of Finance, Commerce, Planning, and Agriculture was created in July 1965 to reformulate this program to obtain maximum efficiency from the coffee fund which had been receiving about $31 per bag of coffee exported. This led in August 1966 to a more effective coffee eradication and diversification program.

A major weakness is the lack of long-term credit for land purchase. Additional credit of this type is needed. The agrarian reform law of 1964 set up a National Agrarian Reform Fund to provide credit for land purchase up to the amount of the annual minimum wage of the region, to be repaid over a 20-year period with interest at 6 percent.

Credit will continue to be a limiting factor in agricultural output and also in the development of a viable tenure structure. Recent progress in providing a more adequate credit structure, however, indicates a lessening of these problems as the overall economy progresses and credit restrictions are relaxed.

AGRARIAN REFORM

The Land Statute or Agrarian Reform Law of November 1964 has barely begun to attack the problem of access to land which is basic to the agrarian problem in Brazil. Because large areas of the country are owned by the Government, opponents of reform have claimed that expropriation is not necessary in order to provide land to the peasant. Most of the land with ready access to markets, however, is privately owned. Large holdings of undeveloped land surrounding settled areas tend to strangle development and result in higher costs for roads and marketing facilities in the more remote areas.

The 1964 law includes a basis for progressive rates of taxation with higher rates for larger holdings and undeveloped land, thereby providing an incentive for development. The land tax is assessed and collected by the Federal Government for the use of the county government. There is no land tax on a farm unit of 25 hectares or less that is cultivated by an individual. Exemptions are also provided for certain forest lands. The law provides for purchase or expropriation of land and its redistribution to small holders. Payment is to be made in 20-year Government bonds corrected for inflation losses and with an interest rate of 6 to 12 percent per year.

The Brazilian law, regarded as more moderate than land reform in other Latin American countries, set up two agencies. The Brazilian Institute of Agrarian Reform (IBRA), directly subordinate to the President of Brazil, is responsible for establishing priority areas for agrarian reform, conducting land expropriation and distribution, and supervising colonies. IBRA will be set up to operate regionally, receiving the advice of regional advisory commissions, composed of farmers, laborers, and other local people.

The second agency, the National Institute of Agricultural Development (INDA), is responsible for promoting agricultural development in the rest of the country, including supervision of colonies, agricultural extension, and promotion of agricultural cooperatives.

The Land Statute also takes over the regulation of agricultural leases and sharecropping contracts, thereby extending protection to about 2 million persons against specific abuses of the landowner, such as unrenumerative labor; establishes lease ceilings; and designates fixed percentages for sharecropper contracts. The previous law regulating leases was passed in 1916. The salaried agricultural laborer comes under provisions of the Rural Labor Statute of 1963.

Brazil's agrarian reform law sets up a broad policy framework from which to launch agricultural development. Considerable time and good administration will be needed to develop the organization necessary to implement this policy. Additional land reform measures in 1966 have been aimed at strengthening this program.

COMMODITY ANALYSIS

Commodities are separated into two general categories for analysis purposes: Food and nonfood. Grouping of food commodities generally follows the pattern used in the demand section of this study. For food commodities, crops are considered first in the following order: Cereals, sugar, starchy root crops, pulses, fruits and vegetables, and oils, fats, and waxes. These crops are followed by livestock and livestock products and other food commodities. Nonfood commodities are considered in order of their importance in production: Coffee, cotton, cocoa beans, tobacco, and other commodities. Inconsistencies in this general classification include inedible fats and oils and cocoa beans. Problems of definition and disposition of edible and inedible fats and oils are avoided to some extent by discussing them together under food commodities. Cocoa beans, largely an export crop providing less than 2 calories per capita per day for food, are discussed with other major export under nonfood crops.

Food Commodities

Total food production increased 56 percent between 1950-54 and 1960-64, from an index of 77 to 120 (1957-59 = 100; table 22). This represented a compound annual growth rate of 4.5 percent. Food production per person increased 1.5 percent annually in the same period. Domestic production accounts for about 95 percent of food consumption.

Over the past decade, the value of food imports (largely wheat) has exceeded the value of sugar and other food crop exports. During 1960-64, food imports averaged nearly $200 million per year, compared with exports of food crops of about $115 million, plus $60 million for cocoa beans and their products. While future food imports may increase, significant gains will depend largely upon an easing of exchange and tariff restrictions as a consequence of improved foreign exchange balances through increased exports, including food crops.

CEREALS

As a commodity group, cereals rank first in production, in consumption, and in the value of imports compared with other agricultural products in Brazil. Corn, rice, and wheat account for about one-third of Brazil's cultivated area and value of crop production. Brazil ranks second to the United States in world corn production, produces over half of the Western Hemisphere rice crop, and has had periodic export surpluses of both crops. Wheat ranks high as a consumption item, but low in domestic production; present consumption levels depend heavily on imports. In fact, wheat accounts for about two-thirds of the value of agricultural imports and 10 percent of total imports.

Wheat is not well adapted to the subtropic and tropic conditions which characterize most of Brazil's farm area. Past efforts to expand wheat production were at the expense of other crops generally better suited to these conditions. Brazil's efforts to gear surplus producing capacity to a growing world market have focused on expanding corn output. Main difficulties are: Establishing satisfactory storage, shipping, and loading facilities. Progress is evident in the level of 1965 exports, which were estimated at 560,000 tons--more than was exported since 1963. Brazil may become a continuing supplier of corn to world markets.

Rice production has been keyed to domestic needs, and less than 2 percent of output has been exported during the last two decades. High 1965 exports came mainly from previous years' stocks that were produced when domestic prices were higher than world prices, and they do not necessarily portend increasing Brazilian competition for world markets. Production and consumption of other grains are small. Combined barley and oat production is less than 1 percent of rice output; rye is a minor crop and no official production estimates are made. Barley and malt, which are largely used for beverages, are discussed under nonfood commodities.

Corn

Production.--In terms of area, corn is Brazil's leading crop and accounts for over 20 percent of census crop area. In 1964 corn surpassed the small coffee crop in value. Corn is a staple food crop on most of Brazil's 3 million small farms and a profitable commercial crop in the South--Sao Paulo, Parana, Santa Catarina, and Rio Grande do Sul--where 75 percent of the crop is grown.

On subsistence farms and where corn is grown by sharecroppers on large holdings, it is planted and harvested by hand. It is usually planted on poorer land in combination with beans, rice, or mandioca. When grown with beans, corn is planted first and, when the ears have matured, the stalks are bent double and left standing for the beans to climb. The beans and corn are then harvested together during the dry season. With this system, field loss to insects and other pests is high.

Fully mechanized production and harvesting on commercial farms is extremely limited. Harvesting is usually by hand even when planting is mechanized. Planting in the South runs from September through December; harvesting runs from March through July with most harvesting completed by May. In the Northeast, corn is planted mainly in February and March and harvested in June and July.

Corn output increased 53 percent from 6.2 million tons annually in 1950-54 to 9.4 million tons in 1960-64--an annual compound rate of increase of nearly 4.2 percent. A record crop in 1965 was estimated at 12.1 million tons. An increase in harvested area of 46 percent between 1950-54 and 1960-64 accounted for most of the larger production (table 30). Average yields increased from 1.2 tons per hectare 1950-54 to 1.3 tons 1960-64. Increasing areas of hybrid varieties, which are said to yield 50 percent more than open pollinated varieties in Brazil, were to some extent offset by the continued spread of corn into less favorable producing areas. One-third or more of the corn production was estimated to be from hybrid seed in 1963 and a continuing upward trend in use of hybrid seed is expected to lead to further gains in corn yields.

Corn production expanded on new farms in Parana, with little competition from other crops. In Sao Paulo, depending on relative prices, corn competes with peanuts, cotton, and castor beans. In Rio Grande do Sul and Santa Catarina, where much corn is fed, it has little competition from other crops.

In spite of many administrative problems, the Government support program effectively encouraged corn production. Improvements in terminal storage and shipping facilities have permitted the Government to buy and move quantities of corn, thus keeping farm prices at or near support levels in 1965. The Government expects to increase production of the soft hybrid varieties that are in demand in most corn importing countries.

If current price levels can be maintained through increased exports and domestic consumption, the high levels of corn output in 1965 likely will be maintained and even increased in time. Even at somewhat lower prices, some growth in corn production is probable as long as corn prices compete with those of other crops.

Demand.--Estimates of corn disposition are based on meager evidence and probably have a wide margin of error. In 1959-61, 62 percent of domestic production was used for feed, 28 percent for food, and 10 percent for stocks, seed, waste, and industrial use (51). Exports took an estimated 7 percent of 1963, and 5 percent of 1965 production and negligible proportions in other years.

In 1959-61, annual corn consumption was about 34 kilograms per person. Corn supplied about 300 calories per person per day or 11 percent of the average caloric intake. However, Brazil's population consumes about one-third as much corn as Mexico's 1,082 calories per capita per day. Corn is used for food in both rural and urban areas, but is probably more generally used in rural areas.

Domestic availability of corn increased 51 percent between 1950-54 and 1960-64, or about the same rate as the increase in production. Consumption of corn as food over the same period probably increased at a somewhat higher rate due to population gains and some increase in consumption.

The corn products industry continued to grow. It took an estimated 2 percent of 1963 production, with further increases estimated for subsequent years. However, part of this may represent duplication of food uses. As an indication of trends, production of corn oil, averaging 2,020 tons in 1950-54 and 2,983 tons in 1955-59, reached 5,226 tons (equivalent to 183,000 tons of corn) in 1963.

Nonfood uses of corn apparently did not increase quite as fast as corn production from 1950-54 to 1960-64. Hogs account for the main feed use and hog slaughter increased an estimated 35 percent for this period, less than the expansion in corn production. Increases of 79 percent in egg production and 76 percent in milk output did not greatly increase feed use of corn, which offset some gains.

In Rio Grande do Sul and Santa Catarina, which reportedly have the country's only well-developed corn-hog economy, considerable corn is fed as a fattening ration. Much of Brazil's lard production comes from this region. In Sao Paulo and Parana, corn more often is grown for food. In other areas, corn is fed green or hogged off. A relatively small portion of shelled corn is fed and currently very little is fed in commercially mixed feeds. The growing market for mixed feed for commercial poultry flocks and dairy herds is still small in terms of corn production and total animal numbers. Corn is rarely included in the ration of beef cattle and Brazilians are said to look with disfavor on beef with back fat. Not much corn is used for silage.

Domestic utilization will probably continue to increase along with production gains as it has in recent years. Such demand could place pressure on production and export supplies.

Trade.--Brazil's corn trade has been relatively unimportant; exports averaged about 1 percent of production in 1950-64, with only occasional imports. Exports generally originated in Sao Paulo and Parana and were the flint-type corn that has had a limited demand, mainly in Italy. However, production and exports of dent corn are increasing.

Exports apparently doubled from 76,000 tons in 1950-54 to 156,000 tons in 1960-64. These averages obscure the fact that exports were only important in 1951 and 1963. Exports during 1963 totaled 700,000 tons, about 7 percent of production and 3.5 percent of world trade in corn, while exports for the previous 10 years totaled only about 100,000 tons. Exports of 560,000 tons in 1965 were hampered by limited port facilities. With a reduced crop, 1966 exports still reached an estimated 550,000 tons.

The bulk of Brazil's corn exports moves to Western Europe; Italy took 95 percent of the small 1964 exports and 82 percent of the large 1963 exports. Only negligible amounts moved into Western Hemisphere markets in either year. Japan took about 5 percent of 1963 exports.

In spite of the comparatively short distance from corn production areas to export ports, a severe lack of handling facilities and high labor costs of onloading at ports will generally raise Brazilian export costs above those in the United States. Brazil's long-term competitive position for corn in world markets is largely dependent on an improvement in grain storage and handling facilities and a reduction in cost per ton for these functions. Current emphasis on increasing and improving domestic grain distribution and the installation of mechanized loading in the ports of Paranagua and Santos in 1965 are expected to cut export costs.

With continued improvement in market facilities bringing about improved quality and decreased marketing costs, Brazil could maintain and perhaps increase corn exports, provided present world price levels and favorable exchange rates continue. However, rapid production gains will be required if exports reach significant levels in view of rapidly increasing domestic demand.

Rice

Production.--Brazil ranks seventh in world rice production, with about 2 percent of total world output. About one-tenth of Brazil's cultivated area was in rice production in 1960, with all States producing considerable quantities, mainly long-grain varieties. The principal rice growing area, Rio Grande do Sul, produces medium-grain (Blue Rose) and short-grain (Japonica) varieties which account for most of Brazil's exports.

Rice production in the major States in 1963, in percentage of total output of rice was as follows:

Rio Grande do Sul	23
Sao Paulo	16
Goias	14
Minas Gerais	13
Maranhao	10
Parana	7
Mato Grosso	5
Other	12
Total	100

Both irrigated and upland rice are produced, with upland rice probably now accounting for more than half of the total. Irrigated rice is grown in floodlands of the major river valleys, using a minimum of investment in water diversion. On large estates on the floodlands of Rio Jacui and Rio Taguari in Rio Grande do Sul, flood waters are held in small reservoirs or irrigation water is pumped from the river. These reservoirs, canals, drains, and other works have been privately built and maintained.

Even in the lower Sao Francisco Valley of northeast Brazil, most irrigation facilities are privately owned and operated. Gates and ditches are so arranged that when the river floods the gates are closed and hold the water in the rice fields. Irrigated rice is the principal cereal crop in this area. In Minas Gerais and Sao Paulo, upland rice is grown extensively with irrigated rice along the rivers.

Most of the Rio Grande do Sul production is mechanized, fertilized, and irrigated. Mechanization has increased; nearly 7,000 tractors were used in producing the 1963 crop, compared with an average of fewer than 2,000 in 1950-54. Yields are 60 percent higher than in the other major producing States and about three times those in lesser producing States where most of the production is on subsistence farms.

In much of Goias and Mato Grosso rice is planted on new land and grown for 4 or 5 years in succession. Without additions of fertilizer or attention to conservation practices, yields fall rapidly. One reason for the popularity of rice in new areas is its tolerance for high mineral content in soils in medium-low rainfall areas. Other reasons are the comparatively high unit value, the ready market, and the storability of the product. In Rio Grande do Sul and many other areas of irrigated rice, few crops are directly competitive, pasture being the major crop in rotation with rice.

Rough rice production increased 71 percent at an annual compound rate of 5.5 percent from 3.2 million tons in 1950-54 to 5.4 million tons in 1960-64 due largely to increased area in cultivation (table 31). Area in rice increased 67 percent between 1950-54 and 1960-64, while yields increased only 3 percent from 1.53 tons per hectare to 1.57 tons. Expansion has been greatest in Maranhao, Goias, and Parana, which together accounted for two-thirds of the recent gain. The rice area in Sao Paulo decreased 20 percent from 710,000 hectares in 1955 to 572,000 in 1962, due to competition from expanding production in frontier areas and better profits from competing crops. In 1963, however, the rice area in Sao Paulo again increased to 676,000 hectares as the area in coffee, cotton, and peanuts declined.

For many years, the Rice Institute of Rio Grande do Sul (IRGA) has maintained its own price support program, with support levels based on costs of production which has resulted in a large degree of price stability over much of Brazil. Relatively favorable grower prices, however, have encouraged expansion in other rice producing States under the price umbrella of the Rice Institute. Other areas took over markets formerly held by Rio Grande do Sul and the Rice Institute accumulated stocks on which it had high storage and interest costs and which were not priced competitively for export to world markets. Government price supports were maintained at a lower level and were largely ineffective. In 1965 the Rice Institute lowered its support levels to fit the Federal program and to permit exports at world prices. The lower support level for Institute rice presumably has lowered consumer and producer prices in other States and may discourage further expansion in production, particularly in Rio Grande do Sul.

Production increases have been due to both Government support policies and strong domestic demand. Demand factors, particularly an increase in support prices for corn compared with decreases for rice and a reduction in the IRGA support price, are expected to lower the rate of increase of rice production. Production of rice will likely continue to increase but at a lower rate than in the last 10 years, in view of lower support prices and current policies based mainly on domestic needs.

Demand.--Rice is Brazil's third most important food crop. Per capita consumption of 59 kilograms of rough rice or 40 kilos of milled rice per year (394 calories per day in 1959-61) was one-third higher than corn and two-thirds higher than wheat. Increases in rice production have gone largely into domestic consumption with only residual supplies, averaging 1 to 2 percent of production, reaching the export market over the period 1950-54 through 1960-64. Per capita rice consumption is high in both rural and urban households and ranges from about 15 kilograms per year in the North and Northeast to over 50 kilograms in some States in the South. Domestic availability of rough rice increased 75 percent between 1950-54 and 1960-64--a compound annual rate of 5.8 percent, slightly higher than the rate at which production increased. Substantially higher wheat and bread prices since 1964 have led to further increases in rice consumption in 1965, although this is partly temporary.

Between 1950 and 1961 retail prices advanced relatively more for rice than for wheat flour and the average of other staples. The Government exercised less price control in this area, and, in fact, encouraged incentive support prices to ensure domestic supplies. In spite of the higher relative price, rice consumption continued to gain, due, perhaps, to the lesser perishability and greater availability of rice compared with bread and potatoes.

Government policy of lower rice prices may further encourage rice consumption and lessen foreign exchange demands for wheat. On the other hand, the sharp uptrend in rice consumption in 1964 and 1965 may level off as internal wheat prices stabilize and consumers adjust to the higher wheat price levels.

Trade.--In spite of its large rice production, Brazil's exports have been significant only in occasional surplus years; exports were sometimes made at subsidized prices or through trade agreements with Communist countries. Peak exports of 222,000 tons of rough rice in 1961 amounted to only 4 percent of Brazil's production and about 2 percent of world rice trade in that year. Brazil's imports of rice have been negligible, but small quantities were received from the United States under Titles II and III of P.L. 480.

Over half of 1961 exports were short grain or Japonese varieties which went mainly to Indonesia; Indonesia was also the largest market for the rest, largely medium grain varieties. Czechoslovakia and Colombia, the next largest markets, took only 10,000 tons each. Most rice exports were milled rice from Rio Grande do Sul, including some lower grade broken rice. Exports trended downward until 1965. Increased exports in 1965 were largely carried over from the 1963 and 1964 crops and were reportedly exported below acquisition cost with the loss presumably covered by the Federal Government.

The change in price support policy to keep domestic rice prices competitive in world markets is expected to curtail domestic production which, with increasing consumption, may reduce export availabilities. However, improving efficiency could put Brazil in a position to expand production and export at a profit. While Brazil is not expected to increase exports appreciably, there also appears little likelihood that the country will become a market for rice imports. With the wide distribution of rice production over the country, imports are not likely to be needed unless temporarily more favorable prices for other crops cause a sharp shift away from rice production.

Wheat

Production.--Wheat ranked 21st among Brazil's crops in value of production in 1963 and output was negligible in terms of world wheat supplies. Domestic wheat production averaged only one-fourth to one-third of domestic use in the decade of the 1950's and between 5 and 15 percent so far in the 1960's (table 32). At its peak, wheat production covered over a million hectares, but since has declined sharply.

Rio Grande do Sul produces 85 percent of Brazil's wheat crop; most of the rest is produced in Santa Catarina and Parana. Brazil has produced wheat since colonial times in the small farm area (Zona Colonial) of Rio Grande do Sul. Production in this area is still significant although mountainous terrain, small farms, and the lack of mechanization result in high production costs. In Rio Grande do Sul's more recently developed prairie area (Zona de Campo) wheat is produced under mechanization in large production units. Farms in this area are said to be about 1,000 acres, with about 600 acres in crops. Since 1920, farming has substantially increased in what is still predominantly a livestock area.

Wheat is grown as a winter crop, planted from late March to July and harvested from late October until mid-December. The wheat areas have an annual rainfall of 40 to 50 inches, distributed throughout the year. Rains frequently complicate harvesting and high relative humidities favor development of diseases, especially rust, mildew, and scab. The leached and acidic soils are quickly farmed out after being taken out of grass. The low level of soil nutrients leaves plants more susceptible to diseases.

The exact level of Brazil's wheat production is difficult to determine. USDA's estimates are based mainly on trade sources within Brazil whose estimates are considerably lower than official Brazilian estimates. USDA estimates that production quintupled between 1935-39 and 1955-59 and subsequently declined to less than 40 percent of the 1955-59 level in 1960-64.

The stimulus of high prices and short supplies after World War II and the Government's wheat incentive program brought wheat production to a peak in 1955-59. However, average yields had already begun to drop in this period due to disease and low fertility, in spite of continued gains in acreage. As yields dropped and incentive prices failed to cover costs or permit competition with more favorable yields of other crops, acreage was sharply curtailed. Consequently, production reached a low in 1963 and for the 1960-64 average. Other crops compete with wheat and much wheat land in the Zona de Campo has gone back to grass in recent years. Production continues mainly in the Zona Colonial where much of the wheat is consumed on the farm or in nearby consuming centers. Some production gains may be made over present low levels of output, but significant gains are not likely in view of the disbandment of the Wheat Expansion Service, the lack of production incentives, and the absence of policies designed to increase output. However, recently the Government has announced that efforts will be made to increase wheat production through a program of increased price support and development of new varieties and wheat land, including irrigation in the Sao Francisco River basin.

Demand.--Wheat ranks fifth in daily per capita consumption, averaging about 9 percent of calorie intake in 1959-61. According to local observers, about 60 percent of flour goes into bread making and about 40 percent into pastas, biscuits, and other uses. Very little flour is sold at retail--even the poorest bread consumer customarily buys commercially baked bread due to lack of home baking facilities. The rural population consumed an estimated 30 percent of 1960 wheat consumption, much of which did not pass through commercial milling and marketing channels (37). Wheat flour is largely consumed in urban areas. Currently, Brazil imports practically no flour except in border areas or into the Amazon region.

The Government has controlled prices of wheat, flour, and bread, and has maintained a monopoly on wheat imports. Brazil's program of production expansion and milling controls began in 1937 under the Flour Trade Control Service in the Ministry of Agriculture. Regulations required the mixing of mandioca and rice flours with wheat flour, and all flour mills were required to grind a quota of nationally produced wheat in order to qualify for imported wheat that was sold at subsidized prices. A national import quota was established with individual mill quotas set on the basis of mill capacity.

Brazil's flour milling facilities include a number of up-to-date establishments along the coast and innumerable small mills scattered throughout the wheat producing zones. The Government has had some degree of control over establishing new mills, but capacity reportedly has increased about 35 times from 0.9 million tons annually in 1944 to 34 million tons in 1964 (based on 24-hour operations). A national milling quota of only 2.9 million tons in 1964 provided for an average of 15 hours of milling operations a week. The Government has attempted to rationalize milling by reducing the number of small inefficient mills and concentrating quotas in the larger, newer mills. Controlled prices have reduced price competition in the milling industry, but the sale of milling quotas has permitted some mills to make money without operating and others to decrease unit costs by working at a higher percentage of mill capacity. Consumption and demand trends have been unusually complicated by the Government's control of import levels and domestic prices. Within the limits of available supplies, however, demand has been responsive to price changes.

The Foreign Exchange Department of the Bank of Brazil (CACEX) has controlled all wheat imports which are duty free. Wheat supplies are, to a large extent, dependent on exchange allocation and on agreements with the United States under the Food for Peace Program. For a number of years, the Government continued to maintain a subsidized exchange rate on wheat below the level of other imports, except for petroleum and paper. As a result of Government subsidies and price controls, bread and wheat flour prices declined relative to competitive starchy foods such as corn, rice, potatoes, mandioca flour, and beans during 1950-60.

While sales of better qualities of bread often were permitted at higher than the controlled prices for the standard loaf and black markets also existed, the price subsidy on the standard loaf encouraged consumption. Limited wheat supplies, however, kept consumption from reaching higher levels at these prices.

Apparent consumption of wheat flour in Brazil, based on Government milling reports and flour imports, ranged from 20 kilograms per capita in 1950 to 34 kilograms per capita in 1955, when both production and imports were high with subsequent declines to 1959. Flour milling reports are no longer published and flour imports have practically been discontinued. Total supplies available, divided by urban population, averaged very close to 60 kilograms of flour per urban inhabitant in 1950-59, generally ranging from 53 to 69 kilograms, but with an apparent availability of 85 kilograms in 1955.

Per capita wheat supplies also have been variable. During World War II Brazil's imports from Argentina maintained a per capita availability of about 30 kilograms per capita. In the immediate postwar period wheat consumption dropped, curtailed by high import prices. Per capita wheat supplies reportedly reached a peak of nearly 50 kilos per capita in 1955 and have declined since that time to about 26 kilos in 1965.

When the Government revalued the exchange rate on imported wheat in early 1963, bread and flour prices in Rio de Janeiro and Sao Paulo increased over 80 percent. In 1964, the wheat import rate was finally freed to follow the general rate on imports and prices again showed a strong increase. Per capita wheat consumption showed a substantial drop as consumers shifted from wheat products to rice, corn, and other domestic foods. Greater stability in the exchange rate in 1965 and continued increases in prices of most other foods have resulted in a gradual relative decrease in bread prices.

Except for a few years during World War II, Brazil has had regulations requiring the mixing of a proportion of mandioca flour with wheat for bread. Also, the use of corn flour and soybean flour has been mandatory at times in order to extend the available supplies of wheat and increase the use of domestic crops.

A combination of large Food for Peace shipments to Brazil and additional subsidies through the Brazilian Treasury have distorted recent trends in wheat consumption. Termination of subsidies in 1964 and reduction of Food-for-Peace shipments leave future trends in doubt. The actual trend in wheat consumption depends largely on Government import policy and relates to foreign exchange reserves, availability of Food for Peace wheat, and availability of substitute domestic food crops. These factors point to slow growth in wheat consumption in the immediate future with stronger growth likely as the foreign exchange picture further strengthens.

Trade.--Since 1960 wheat imports averaging 2.2 million tons per year have supplied 90 percent or more of Brazil's requirements and amounted to about 7 percent of world wheat trade. Practically all imports have been in the form of grain. Small quantities of wheat flour have been imported into the Amazon region and border areas, but flour imports have averaged less than 1 percent of the total imports of wheat and flour. Major milling centers are in Rio de Janeiro and Sao Paulo, but old or modern mills exist in all the major ports and in other cities over most of the country. Shallow-draft coastal vessels from Argentina frequently serve the smaller ports; larger ocean vessels are used for U.S. shipments to the larger ports.

The United States achieved a dominant position in supplying wheat to Brazil during the 1960's. Prior to that time Argentina dominated the market, although there were some shipments from Canada, Russia, Uruguay, and France.

During 1955-65, Brazil had five agreements with the United States under the Food for Peace Program, specifying imports of over $400 million worth of wheat, mainly under Title I of P.L. 480. The fifth agreement expired in 1965 without delivery of all the wheat imports. A new agreement was negotiated in 1966.

In 1963, in an attempt to broaden trade, sell coffee outside its traditional markets, and insure wheat supplies from nondollar markets, Brazil signed an agreement with Russia to take 500,000 tons of wheat in 1963, 600,000 tons in 1964, and 700,000 tons in 1965. Due to short domestic crops, Russia was able to deliver only 263,000 tons of the 1963 commitment and provided nothing for 1964 or 1965.

Brazil has a wheat agreement with Uruguay, but that country has also been unable to maintain an exportable surplus, supplying only 40,566 tons annually in 1959-64.

Total Brazilian wheat imports increased 52 percent between 1950-54 and 1960-64. The U.S. share of this nearly quadrupled--from 357,000 tons to 1,351,000 tons--while Argentina's share dropped 14 percent, from 762,000 tons to 658,000 tons. Imports from other countries declined 45 percent, from 320,000 tons to 176,000 tons; Canada dropped out of the Brazilian market.

Brazil has had a long-time commitment from Argentina, its traditional supplier, for 1 million tons of wheat a year with the provision that in any year when Argentina's production was less than 3 million tons it would make available to Brazil one-third of the exportable production. However, Argentine exports to Brazil averaged only 551,000 tons in 1961-63 compared with an average of 990,000 tons over the previous 8 years. The Argentine-Brazilian agreement was renegotiated in 1964 to provide for a million tons per year for 3 years starting in 1965 and the possibility of reopening negotiations each year if wheat supplies and the balance of trade were such that Argentina could supply more wheat. Reportedly, a supplemental agreement for an additional 150,000 tons of wheat was reached in 1965.

Increasing bilateral trade with Argentina within the LAFTA agreement is expected to strengthen Argentina's share of Brazil's wheat market in the future. Other trade commitments, however, are likely to limit the extent of wheat trade between the two countries. As the Brazilian economy strengthens and foreign exchange reserves increase, the United States will be in position to compete for a portion of Brazil's cash market for wheat and probably maintain a larger share of Brazil's wheat market than before the Food for Peace Program. Also, further agreements under the Food for Peace Program will assist in maintaining this U.S. share of the Brazilian imports.

SUGAR

Although about 80 percent of Brazil's sugar production goes into domestic use, sugar has ranked fourth among agricultural exports in recent years. Brazil faces a dual problem in sugar production, to protect and modernize the high-cost northern sugar producing areas, and, at the same time, to expand production and exports from the low-cost southern area.

Production:

Brazil ranks second, after India, in world sugarcane output but about fifth in world production of centrifugal sugar. Over 1.5 million hectares--about 5 percent of Brazil's crop area--are devoted to the production of sugarcane. Between a half and two-thirds of cane production is used to produce centrifugal sugar. Data are not available on total utilization of cane but the remainder evidently is used by small producers of crude sugar, for alcohol production, and for livestock feed.

The Sugar and Alcohol Institute (IAA) lists two commercial sugar zones. The traditional northern sugar zone, including mainly the humid coastal zone of Pernambuco, Ceara, and Alagoas, and Sergipe and Bahia, provides about one-third of total output. The southern zone, including the States south and west of Bahia (mainly Sao Paulo, Minas Gerais, Rio de Janeiro, and Parana) provides about two-thirds of total sugar output.

The southern zone accounts for an even larger share of total cane output, with a greater proportion of cane used for other purposes than production of centrifugal sugar. Production of sugarcane has expanded most rapidly and is widespread--the most important States being Sao Paulo, with 28 percent of 1963 cane area, Pernambuco with 18 percent, Minas Gerais with 11 percent, and Alagoas with 7 percent.

In the northern zone about half the cane is grown on privately owned land and about half on mill-owned lands. In either case, however, most cane is produced on small, high-cost farm units as mill land is generally let out to tenants. The owner does the plowing, and the tenant provides all other labor and is paid on the basis of tons of cane cut. The mill generally buys from the independent grower at about the same cost as for cane produced on mill lands. While the southern zone also has many small producers, most cane production, particularly in Sao Paulo, is in larger units. Considerable progress has been made in mechanizing cane harvest and transportation; larger, more efficient mills also help cut sugar production costs. Prices for cane going into centrifugal sugar are regulated by the IAA and are based on the yield of sugar per ton of cane and the regulated price received for sugar by the mill, less standard deductions. The price of cane for noncentrifugal uses is not regulated.

Area in cane increased 56 percent and production of cane increased by over two-thirds between 1950-54 and 1960-64--a compound annual growth rate of 5.4 percent (table 33). Brazilian cane yields increased 10 percent, from 39 tons per hectare in 1950-54 to 42.9 tons in 1960-64, largely as the result of increased acreage in the higher yielding southern zone. The amount of cane used to produce centrifugal sugar nearly doubled between 1950-54 and 1960-64; however, the trend was downward from the high point of 1960 through 1964, with new peaks in 1965 and again in 1966.

The DE estimates total sugarcane production and the IAA provides statistics on sugar production and on cane used in production of centrifugal sugar based on mill reports. The difference between these two statistical series is assumed to represent amounts used in production of alcohol, noncentrifugal sugar, and livestock feed. Alcohol is estimated to be the major use after centrifugal sugar. Between 1950 and 1960, cane used for centrifugal sugar more than doubled from 15 to 37 million tons while production of cane for other uses fluctuated between 16 and 19 million tons. The gain for centrifugal sugar over the period was from 45 percent to 65 percent of total cane production. Between 1960 and 1963, however, the amount of cane going to uses other than production of centrifugal sugar apparently increased 48 percent to 29.5 million tons, or 46 percent of total cane production. The utilization of the increased cane production is not clear from available data because production of alcohol from cane showed a 24-percent drop over the same 4-year period.

Based on crop year data of the IAA, production of hydrous alcohol from sugarcane juice in distilleries under supervision of the IAA averaged 243 million liters annually in 1959/60 to 1963/64, up 43 percent from 10 years earlier. Production of anhydrous alcohol, mainly from molasses, averaged 178 million liters annually in 1959/60 to 1963/64, two-and-a-half times the level of 10 years earlier (1949/50 to 1953/54). Alcohol production is concentrated in the southern zone; 71 percent was produced there, compared with 64 percent of sugar in 1959-63.

After 400 years as a sugar producer and exporter, Brazil's sugar industry is a composite of modern and obsolete facilities. Over 500 mills were capable of producing centrifugal sugar in 1963 and there were nearly 300 sugar refineries; many of both types date back to the turn of the century. In addition, 12,000 small mills were capable of producing noncentrifugal sugar and 48,000, the crystalline brown sugar known in Brazil as "rapadura." Over 400 distilleries take practically all molasses production and also use surplus cane for the production of industrial alcohol. An additional 14,000 small distilleries make "aguardente" (beverage alcohol), for which no production data are collected.

There is no real competition between cane uses. Production of centrifugal sugar is by far the preferred use but is limited by quotas; noncentrifugal sugar and alcohol production apparently are able to take all the cane not needed. Some cane is used for stock feed, but no estimates are available as to quantity involved, nor is data at hand to show the competition between cane and other livestock feeds.

The Sugar and Alcohol Institute publishes statistics on centrifugal sugar production for the calendar year and for a production year--June through May; 85 percent of the harvest falls between July and December. The IAA makes no estimates of noncentrifugal sugar production, but unofficial estimates place it at an average of 272,000 tons in 1959-61--about 8 percent of total sugar output. Centrifugal sugar production doubled during the 1940's, and again during the 1950's, to nearly 3.6 million tons in 1955. Average production in 1960-64 of 3.3 million tons was 84 percent above the 1950-54 average output--a compound annual growth rate of 6.1 percent (faster than the 5.4 percent gain in cane production).

Most of the increase has taken place in the South, with that zone reaching 50 percent of national production in 1950 and 64 percent by 1963. Sao Paulo alone provided 46 percent of 1963 production and Rio de Janeiro, Parana, and Minas Gerais had significant output. Yield of sugar generally ranges between 89 and 92 kilograms per ton of cane processed. There is no evident trend in sugar yield within zones nor any consistent difference between sugar yields in the northern and southern zones; in some years the South is higher and other years the North.

For a number of years, Brazil's sugar economy has labored under the weight of maintaining the northern zone in sugar production because of a lack of economic alternatives for the area. The northern zone is at a disadvantage, due to a combination of inefficient methods of cane production, small ownership or small tenant holdings, primitive transportation and long distance to mills, and the lack of profitable alternative crops.

In 1951, the IAA instituted a uniform price to sugar producers and regulated wholesale prices and adjusted freight rates so that northern zone producers could compete in southern markets. The difference between production costs and market prices was paid into a special fund for equalizing prices and subsidizing exports. This improved the competitive position of the northern zone and permitted sugar output to grow 38 percent from 912,000 tons in 1954/55 to 1,261,000 tons in 1964/65. Over the same period, however, southern production increased 89 percent from 1,222,000 tons in 1954/55 to 2,303,000 tons in 1964/65. The increase in southern production almost equals northern production. As the southern crop increases its proportion of total output, the extra cost of northern production becomes less of a drag on the total sugar economy. Given free competition, the southern sugar zone might greatly increase output.

Sugarcane competes successfully for the better land against most crops. The necessity for a sugar quota to receive top prices for cane limits the extent of competition, but the existence of large areas of nonquota cane indicates both the strong position of sugarcane versus other crops and the speculative nature of much of the cane planting. Frequently, growers will plant more than their quota of cane in hopes of a later increase.

Northern zone growers have few alternative crops that will replace cane and still provide adequate cash incomes and utilize available labor. The entrenched political position of sugarmill operators who lack alternative uses for their plant and investment also narrows the Government's alternatives in looking for a new sugar policy. Industrial and population growth in the northern zone, however, is increasing the demand for locally produced food which, under competitive pricing, might substitute for much of the sugar production in this area.

The southern zone still has too many inefficient sugarmills in spite of modernization efforts. A few modern mills substituting for the many obsolete mills would do much to improve the efficiency and lower the costs of sugar production. Following the high world sugar prices of 1963/64, the Government granted authority to establish 50 new sugar mills, mainly in western Sao Paulo and northern Parana, financed in part by coffee funds for the diversification of coffee farms.

Apart from the northern zone, the Brazilian sugar industry is fairly flexible and production costs are reasonably low. Flexibility comes from the sizable surplus cane production, reportedly ranging up to 50 percent of the total, that is used largely for alcohol. By lengthening the sugar grinding season and reducing stocks of alcohol and sugar, Brazil can rather quickly provide additional sugar for export. The lower average price paid for cane for alcohol indicates a low marginal cost of expanding sugar output.

The outlook for the immediate future indicates that Brazil will attempt to reduce production to the level needed to meet domestic demand plus exports possible under special trading arrangements. Even with substantial surplus capacity Brazil is reluctant to sell at low world prices. Sugarcane area is unlikely to expand as rapidly as in the past decade and could actually decline for a period.

Demand:

Brazil's centrifugal sugar is largely consumed domestically; about 15 percent is exported. In addition, appreciable amounts of noncentrifugal sugar go into domestic consumption. Per capita consumption averaged 417 calories daily in 1959-61; 91 percent of this was estimated to be centrifugal sugar. For the domestic market, mills generally produce a semirefined crystal sugar. Output of highly refined sugar is limited to quality markets. For export, output is largely demerara or unrefined sugar. Improving transportation is cutting into the market for rapadura.

Centrifugal and noncentrifugal sugar consumption averaged almost 40 kilos per person in 1959-61, compared with approximately 25 kilos per capita in 1950 and 17 kilos in 1940. Sugar accounted for about 15 percent of total calorie consumption in 1959-61. Consumption was stimulated by an improvement in consumer prices, which rose 25 percent less for sugar than for other staple foodstuff in 1950-60. Consumption in the northern zone is estimated to be only about half that of the southern zone.

Like most large consuming nations, Brazil has strict controls on sugar marketing. Production, processing, prices, and exports have been effectively controlled since 1933 by IAA--an autonomous body under the general jurisdiction of the Minister of Commerce and Industry. IAA was formed to control sugar production by converting excess sugar to alcohol during a period of low world sugar prices. Its board of directors is made up of representatives of Government agencies and private sugar interests. IAA regulates production to fit domestic consumption and, at the same time, takes advantage of export opportunities. Exports to all countries since 1955 have averaged over half a million tons per year.

The IAA fixes production quotas for mills producing centrifugal sugar, and it may also limit the number of days during the season that mills are permitted to grind cane. It fixes producer and wholesale sugar prices; finances growers through mills and cooperatives at low interest rates; and manages the Fund for Recuperation of the Sugar Industry and the Fund for the Defense of Sugar prices.

IAA maintains the same basic price of sugar and cane over the whole country, with the domestic price of sugar set high enough to cover any losses on exported sugar. The Government endeavors to limit production to that which can be sold profitably at combined domestic and export prices. The level of domestic consumption and prices determines the amount of subsidy available to cover the export price differential, limits the amount of sugar that can be exported, and largely determines production quotas set by the Institute.

The actual level of grower prices and production is worked out within the framework of retail price controls under SUNAB. Mills and growers have quotas of cane and excess cane must be used for alcohol or other nonsugar uses. On occasion, mills are allowed to produce more sugar than their mill quotas, often at reduced prices or for world prices. The whole price program is self-financing through regulation of domestic prices and the sugar industry receives no regular payments from the Treasury. Various production taxes go to support IAA and to provide loan funds for Recuperation of the Sugar Industry. Regular sales and consignment and consumption taxes go to State and Federal treasuries.

Alcohol, which is the main alternative use for nonquota cane, also is strictly controlled. In the past decade, practically all Brazil's anhydrous alcohol has been mixed with gasoline for motor fuel in a ratio of 15-20 percent alcohol to 85-80 percent gasoline. Recently, hydrous alcohol has been largely used for beverages or exported. Alcohol exports rose from $1.1 million in 1962 to $5.0 million in 1964. A synthetic rubber plant completed in Pernambuco in 1965 reportedly is scheduled to take 80 percent of current production of alcohol, indicating a probable decline in exports and in the use of alcohol for motor fuel.

Domestic utilization of centrifugal sugar will likely increase but at lower rates than in the past. This would appear to be reasonable in terms of probable supplies, recent trends, and current levels of sugar consumption.

Trade:

Brazil usually ranks in the top 10 sugar exporters. An average of over half a million tons was exported in 1960-64, with a peak of 783,000 tons in 1961. Exports subsequently declined to 253,000 tons in 1964, but 1965 exports reached 760,000 tons and 1966 was estimated at a record 900,000 tons.

Except for sales to the United States, Brazil's exports usually have been sold on world markets at prices lower than those prevailing in domestic markets. Because of high costs of coastal shipping, it has been preferable to subsidize exports from the northern sugar area rather than shipping northern zone surpluses to southern zone markets. The northern zone usually supplies 75 to 90 percent of Brazil's exports, although Sao Paulo has supplied as much as 40 percent. In 1962-64 nearly 75 percent of Brazil's sugar exports went to the United States, 6 percent to Uruguay, and most of the rest to western Europe. In 1960 and 1961 Japan was the largest market.

Heavy investment in sugar refineries in 1965 has resulted in a ready disposition to expand sugar production even when world prices are low. The Brazilian producers' incentive has been the traditionally favorable price set by IAA rather than the world price.

Until current surplus conditions and low world prices improve, Brazil is not expected to push for increased sugar exports except to protected markets. In the longer run, Brazil hopes to reduce average costs of production and find profitable exports at world prices, particularly if a new world sugar agreement can be reached. Export availabilities could increase considerably, together with a possible gain in output.

STARCHY ROOT CROPS

As a group, starchy root crops account for about a fifth of Brazil's calorie consumption, but play only a small part in trade. This group includes mandioca (cassava), sweetpotatoes, and potatoes. Among Latin American countries, only Paraguay exceeded Brazil in consumption of starchy root crops in 1959-61. High productive capacity and low demand elasticities are stimulating development of foreign markets for feed and industrial uses of mandioca, the chief commodity in this category.

Production:

With an output of almost 28 million tons in 1964, the volume of starchy root crops surpassed output of all Brazilian crops except sugarcane, and ranked third in the farm value of production. They rank fifth in cultivated area with 2.1 million hectares--about 7 percent of total crop area in 1964. Mandioca production averaged over 20 million tons in 1960-64, harvested from about 1.5 million hectares or 5 percent of Brazil's total crop area (table 34). Output averages over 13 tons per hectare. Potatoes and sweetpotatoes together total less than 15 percent of the level of mandioca output. These crops, when harvested, are somewhat less perishable than fresh mandioca, but sweetpotatoes have the advantage over potatoes in that they can be stored indefinitely in the ground and harvested as needed, or can be processed into meal and flour.

Mandioca is normally a perennial plant, but generally is harvested in its second year for its large tuberous root. The crop is produced in all States, and is grown both for subsistence and commercially. Bahia and Rio Grande do Sul, the leading States, together with Santa Catarina, Minas Gerais, and Sao Paulo, provide about half Brazil's total output. There are two varieties. Sweet mandioca, called aipim, is eaten as a vegetable--boiled, baked, or raw--and may be fed to livestock; it accounts for about one-fourth of total production. The mandioca brava must be cooked before it is edible and generally is processed into a meal or flour.

Sweetpotato production averaged about 1.4 million tons in 1960-64 (table 35). Rio Grande do Sul, Santa Catarina, and Parana account for over half of Brazil's production, and Paraiba and Rio Grande do Norte produce an additional 15 percent.

Production of white, or what the Brazilians call English, potatoes averaged nearly 1.2 million tons in 1960-64, and is confined largely to the South, with Sao Paulo supplying about 40 percent, Rio Grande do Sul and Parana another 40 percent, and Minas Gerais and Santa Catarina most of the rest (table 36).

Between 1950-54 and 1960-64, production of mandioca and English potatoes increased about 55 percent and sweetpotatoes 67 percent. Recent production trends have been strongly upward; mandioca and sweetpotato production increased by about 50 percent between 1958 and 1964. White potato production increased less rapidly--less than 20 percent in the same period. Production potential is limited only by markets.

On both commercial and subsistence farms, starchy root crops compete with corn, with each other, and with other vegetables. There are no price supports for these commodities.

Demand:

The daily 1959-61 calorie consumption per person of starchy roots was as follows:

Mandioca (fresh)	105
Mandioca (product)	328
Sweetpotatoes	47
White potatoes	23
Total	503

Over one-fourth of mandioca production was estimated to go into nonfood consumption in 1959-61 and nearly three-fourths into food uses. About one percent of total output was exported. Potatoes and sweetpotatoes were mostly used as food, with an estimated 19 percent used for other purposes in 1959-61. There are small imports and occasional exports of white potatoes, but no reported trade in sweetpotatoes.

About 60 percent of total mandioca output was processed in 1959-61 for food, feed, or industrial uses. According to one study, annual per capita consumption of processed mandioca varied between about 20 kilos in some States to over 100 in others. Consumption in the Northeast region averaged over 70 kilos per year with considerable imports from the South and from the State of Para.

Processing is done commercially as well as on the farm. It consists of dehydrating the grated product. Much of the mandioca meal is further milled to produce a finer flour. Mandioca also may be processed to produce a starch similar to potato starch which is used industrially as well as in food products. The flour or meal is consumed throughout the country, sprinkled liberally over other foods, and used in preparing soft breads and other dishes. Apparently, it is the cheapest food for Brazilians, as well as having marked taste appeal. Mandioca flour has been used also as a wheat flour extender with a government-enforced compulsory mixture of as high as 10 percent during periods of wheat scarcity. Currently, the mixture is not compulsory, but still is widely used in producing cheaper breads.

Potatoes and sweetpotatoes are largely purchased fresh. There is little market for potatoes for processing, such as exists in the United States. An improvement in marketing facilities may continue to increase consumer interest in these crops but they have a long way to go before they make substantial inroads into consumption of rice and mandioca meal, which have much better keeping qualities in Brazil's climate.

Domestic utilization of starchy roots is expected to continue to increase in proportion to population growth. Little per capita increase is expected, unless shortages of other foods result in substitution.

Trade

Brazil exports processed mandioca as starch, meal, and tapioca, and imports some fresh potatoes; no trade in sweetpotatoes is reported. Exports of mandioca products averaged 152,000 tons, fresh equivalent, or 38,000 tons product weight with an average annual value of $2.4 million in 1960-64. Potato imports averaged 6,382 tons for the same period, mainly from Argentina, valued at nearly $1 million annually. Exports of mandioca products have been quite variable. Over 62,000 tons in 1964 and about 11,000 tons in 1963. Exports averaged about 38,000 tons in 1960-64, compared with 21,000 tons in 1955-59.

Two-thirds of 1964 mandioca exports consisted of flour shipped to West Germany, where reportedly it was used as animal feed. The United States took about a fourth of 1964 exports as mandioca starch. Tapioca accounted for only 2 percent of the total, shipped mainly to the United States. Thailand, which is Brazil's major competitor, produces mostly for export and has greatly increased production and exports in the last 10 years.

Brazil's concern with domestic food consumption in the last decade may have obscured the competitive standing of this crop as an export commodity. Increasing commercial production as well as domestic availability of nutritionally more desirable foods may turn attention towards making this crop more competitive with corn as a feed-crop export.

For the future, export of cassava products will depend on export demand. Trade in sweetpotatoes and potatoes is expected to be negligible.

PULSES

Dry beans provide an estimated 77 percent of Brazil's total pulse production; dry peas, lentils, and broad beans make up most of the remainder. Estimates of production of lentils and dry peas are incomplete. Peanuts and soybeans account for a small portion of pulse consumption but are grown basically as oil crops in Brazil. Dry bean production totaled 2.0 million tons in 1964 from 3.1 million hectares, about 10 percent of Brazil's cultivated area. Brazil is the world's largest dry bean producer, with total output nearly twice that of Europe or the United States and greater than production in the rest of Latin America.

Production:

To a large extent, Brazilian dry bean output takes place on small farms with hand labor, interplanted with corn or root crops. Dry beans are produced over most of the country, with Parana having nearly one-fourth of 1963 production, and Minas Gerais, Sao Paulo, and Santa Catarina combined, 29 percent. In the South, two bean crops are raised; the first crop is generally much larger than the second. The North and Northeast generally produce only one crop, harvested more or less at the same time as the second crop in the South. Production in the North is deficit, but the Northeast is surplus, as is most of the South. Sao Paulo, however, is a deficit State.

Dry bean production increased 38 percent from 1950-54 to 1960-64 on an area increase of 45 percent, although average yields declined 5 percent (table 37). Support price levels of other crops have not declined as sharply and dry beans may be in poorer competitive position relative to corn and soybeans than in the earlier period. The Government apparently intends to maintain dry bean production at levels needed for domestic consumption but not to encourage export surpluses.

Production of dry beans is expected to increase in line with domestic needs. Production of other pulses will continue to be of lesser importance.

Demand:

Pulse consumption for food of 1.6 million tons provided 218 calories per capita per day in 1959-61--41 percent higher than the average for Latin America and second only to Haiti. Brazilians obtained 21 percent of their protein from pulses, compared with 15 percent for Latin America as a whole. (These comparisons include small amounts of nuts for Brazil). Domestic consumption takes the total production of beans, peas, and lentils, except for an occasional small export surplus of dry beans; imports also are small. Pulse consumption includes some peanuts and soybeans averaging about 7 calories 1959-61.

Dry beans are the main component of the traditional Brazilian dish "feijoada," used by most of the population; consumption is uniformly high in both rural and urban areas over the whole country, ranging from 22 kilos per capita in Minas Gerais and the South and Central West to about 15 kilos in most other States in 1960. Urban consumption is thought to be somewhat higher than rural. For pulses as a whole, yearly consumption per person averaged 23.9 kilograms in 1959-61, up 2.8 percent from 1956-58.

Future demand will be affected somewhat by the availability and price of competing foods and proteins in livestock and other products, but the elasticity of substitution is not high and a continuing small increase in per capita pulse consumption is likely over the next several years.

Trade:

Brazil is generally self-sufficient in production of pulses with small imports some years and exports other years.

Exports, mainly dry beans, totaled 1,500 tons in 1954 and 1955, and 7,000 tons in 1961, but have been negligible since. Imports totaled 7,000 tons in 1963 and 1964, mostly dry peas. The United States shared this market with Argentina. Brazil is unlikely to enter world bean trade either as an importer or exporter under current domestic policies and prices aimed at self-sufficiency.

FRUITS AND VEGETABLES

Compared with pulses and starchy root crops, fruits and vegetables rank somewhat lower in value of production, much lower in calorie intake, and probably considerably higher in retail value due to their higher marketing and processing costs. Low consumption levels point to large potential increases, but improved production and marketing standards are needed to satisfy more sophisticated demands for both fresh and processed fruits and vegetables in both Brazilian and foreign markets.

Production:

Fruits and vegetables accounted for about 8 percent of the reported farm value of 1963 crop production. Fruit crops make up about 85 percent of the combined fruit and vegetable production. Bananas and citrus make up over two-thirds of Brazil's fruit production; bananas alone about 45 percent, with the remainder largely other tropical fruits, such as mangoes and pineapple. Some apples, peaches, and pears, however, and a considerable volume of grapes for wine are produced in the South. DE estimates the production of the 14 principal fruit crops in numbers of fruits. Average 1959-61 production for these, was as follows:

	1,000 tons
Bananas	3,345
Oranges	1,678
Other citrus	194
Grapes	428
Mangoes	542
Pineapple	263
Apples, peaches, and pears	121
Other fruits	410
Total	6,981

The scattered plantings, the lack of commercial plantings, and the tendency for surplus production to be wasted because of lack of marketing facilities limit the accuracy and usefulness of production statistics. Fruit is raised both in large commercial orchards, mostly in the South and East regions, and on small farms and garden patches throughout the country. A general lack of grade standards and wholesale marketing facilities restrains expansion of production, consumption, and exports of fresh fruits. The development of a frozen orange juice industry in 1963 directed attention toward increasing yields and quality of citrus fruit and improving grade and standards.

Over half of citrus production is concentrated in the South, with 35 percent of 1963 production in Sao Paulo. Next largest producers are Minas Gerais and Rio de Janeiro with 14 percent and 11 percent, respectively. Some citrus is grown in every State.

Bananas are widely grown, but four States--Sao Paulo, Ceara, Minas Gerais, and Rio de Janeiro--accounted for one-half of 1963 production, and Pernambuco and Espirito Santo for another 15 percent. Pineapple production is centered in Paraiba and Minas Gerais which had 47 percent of 1963 production; Sao Paulo, Pernambuco, and Rio de Janeiro accounted for an additional 26 percent; with the remaining production scattered widely from Rio Grande do Sul to Amazonas. Two-thirds of grape production is concentrated in Rio Grande do Sul and is mostly used for wine. Sao Paulo expanded production of grapes and accounted for 19 percent of the 1963 output. Production of apples, peaches, and pears is largely confined to Rio Grande do Sul; quality varies and output has not increased much. Other fruits are grown rather widely.

Production of all fruit crops increased an estimated 57 percent between 1950 and 1960. Banana production increased 64 percent from 2.3 million tons in 1950-54 to 3.8 million tons in 1960-64 (table 38). Total production of oranges (as estimated by DE) showed an average rate of growth of about 4.3 percent per year with a 53 percent increase in production during 1950-54 to 1960-64 (table 39). Commercial orange production, as estimated by USDA, averaged about one-half of total production and nearly doubled from 408,000 tons in 1950-54 to 794,000 tons in 1960-64.

Brazil has a vast potential for production and processing of citrus and tropical fruits. Lack of standard varieties and the need for improved disease and pest control are the main barriers to market expansion. Progress in this area is slow but bears watching for increased competition in export markets.

Apart from starchy root crops, DE lists production for only three vegetable crops; 1959-61 reported production was as follows:

	1,000 tons
Onions	196
Tomatoes	399
Garlic	27
Total.	622

Other vegetable production was estimated at 438,000 tons--a total of 1,060,000 tons. In addition, DE reported production of watermelons and other melons, included in USDA food balances with fruit, equivalent to 496,000 tons, for a total output of vegetables and melons of 1,556,000 tons. Vegetables and melons typically are grown on small general or specialized farms surrounding the larger metropolitan centers. Japanese and other growers near the city of Sao Paulo established highly commercial vegetable production; other metropolitan areas are less well supplied.

The above estimates of fruit and vegetable production for 1959-61 total 8,537,000 tons and correspond to estimates used in the USDA food balances for this period (33). Indications are that the production of these commodities is increasing rapidly, but it is uncertain as to whether or not gains will be sufficient to meet the rapidly increasing demand. While data series for this group as a whole are either inconsistent or inadequate for gaging total production trends, trends are fairly indicative for bananas and oranges and rapid gains are expected.

Demand:

Consumption per person of fruits and vegetables, apart from starchy root crops, totaled 100.5 kilograms per year or 128 calories per day in 1959-61. Calorie distribution was 51 percent, bananas; 42 percent, other fruits; and 7 percent, vegetables. Domestic consumption--mainly fresh--took 95 percent or more of the total production and exports took about 5 percent during 1959-61. Imports were about one-fourth the amount of exports. Little information is available on the quantity of canned and preserved fruits and vegetables produced or consumed. Restrictions on imports of processed fruits have encouraged the domestic processing industry. However, high relative prices, variable quality, and the general low income level continued to restrict consumption of preserved and canned fruits. Modernization of processing facilities may eventually reduce costs of the processed product and increase the rate of growth in consumption. Also, upward trends in fresh consumption are complicated by the higher level of commercialization needed to supply the increasingly urban economy.

Total fruit and vegetable demand will probably increase very rapidly over the next few years. Production and marketing systems will be severely taxed to meet this demand.

Trade:

In value, imports of fruits and vegetables for 1960-64 averaged $20.7 million, surpassing exports which averaged $14.6 million.

Over two-thirds of fruit imports, $15.5 million in 1960-64, were fresh, with dried and canned fruits comprising the remainder (table 40). Fresh fruit imports were largely apples, which averaged 46,523 tons for 1960-64 valued at $8.1 million, and pears averaging 9,868 tons valued at $1.6 million, almost entirely from Argentina.

Brazil's imports of fruit, from a peak value of nearly $32 million in 1951, slipped to a low of less than $7 million in 1958 but recovered to $21.6 million in 1963. Although the value of imports is still well below the 1951 peak, the volume of imports totaled 94,600 tons in 1963 and had nearly recovered the 1951 level of 103,000 tons. However, both volume and value declined again in 1964. The U.S. share of fruit imports has been small; it declined from an average of $1.7 million in 1950-54 to less than $50,000 a year since 1960. Imports from the United States averaged 2,414 tons of pears and 2,568 tons of apples in 1950-54, but little or none since that time.

Fruit exports totaled $11.3 million in 1960-64; $4.1 million of this was bananas, $5.3 million oranges, and $1.9 million other fruits and fruit products, largely fresh fruit. Vegetable exports were valued at $3.3 million in 1960-64, largely peppers, tomatoes, and canned hearts of palm.

Brazil ranks about sixth in world citrus exports. Fresh citrus exports in 1964 totaled 104,000 tons--93 percent oranges, 3 percent grapefruit, 3 percent lemons, and 1 percent tangerines, totaling $3.85 million. Sao Paulo and Rio de Janeiro supplied practically all citrus exports. Ninety percent or more of the fresh fruit exports went to Europe; the Netherlands took about one-third, and the United Kingdom and West Germany together another third. Brazil exported a Valencia-type juice orange that brought a somewhat lower price than California, Spanish, or Palestine oranges. Brazil's exports of oranges generally ranged between $4 and $6 million in value.

After the Florida citrus freeze of November 1962, Brazil moved quickly into production of frozen concentrated orange juice by setting up a plant and exporting products by May 1963. Exports totaled 5,313 tons in 1963, valued at $2.2 million, and 3,825 tons valued at $1.4 million in 1964, mainly to Canada and to the United States for use and reexport to Canada. The U.S. duty of $2.15 per gallon effectively protects the U.S. market for frozen orange juice. A decline in demand for this product which followed recovery of Florida production has been disappointing to Brazilians, but Brazil expects to find a permanent place as an exporter of frozen citrus juice.

Brazil ranks fourth or fifth in world banana exports, with about 6 percent of world exports averaging 227,135 tons in 1960-64, up 25 percent from 182,000 tons in 1950-54. The value of exports was $4.1 million in the recent period and $11.1 million in the earlier period. Brazilian bananas are smaller than those demanded by the U.S. market and move largely to Argentina.

Brazil's potential for production and processing of citrus and tropical fruits will provide for continued growth in export of these items, provided that output exceeds rapidly expanding domestic needs. Brazil has long had a trade agreement for the exchange of citrus fruit and bananas for Argentina's apples and pears. The nearness and natural complementarity of Brazil's and Argentina's agricultural production, plus the recent moves towards strengthening economic integration within LAFTA, are expected to increase trade in fruit and vegetables between the two countries. Brazil also expects an increase in canned fruit imports and exports. The Government recently announced measures designed to foster development of the food processing industry by relaxing import controls and charges on food processing equipment and easing credit requirements in order to strengthen the domestic food processing industry against competition within LAFTA.

Imports of fruits and vegetables from non-LAFTA countries are not likely to make a significant growth unless trade restrictions are relaxed. Brazil's exports of citrus, orange juice, and pineapples may increase.

OILS, FATS, AND WAXES

Brazil's production of fats, oils, and waxes includes a wide variety of animal, vegetable, edible, and inedible types. Production of some 33 varieties of vegetable oil is reported, as well as several classes of animal fats, vegetable waxes, and beeswax. Brazil is largely self-sufficient in both edible and inedible types; some of both groups is exported. However, edible types are mostly consumed domestically, while inedible types are exported.

Production

Brazil's production of 600,000 tons in 1960-64--up two-thirds from 1950-54 (table 41). Nearly three-fourths of total production is of vegetable origin and over one-fourth of animal origin. Vegetable wax production averaged 12,000 tons for 1960-64.

Vegetable Oils.--Production totaled 428,000 tons in 1960-64--double that of 1950-54. Seven crops--cotton, peanuts, castorbeans, babassu, soybeans, oiticica, and cocoa beans--provided over 90 percent of the volume and value of vegetable oil production.

Six States--Sao Paulo, Parana, Bahia, Rio Grande do Sul, Ceara, and Pernambuco--account for over 80 percent of vegetable-oil production, and Sao Paulo alone accounts for 42 percent. Production of oilseeds and nuts is somewhat less concentrated because of shipments of unprocessed seeds and nuts from producing areas.

Cottonseed supplied 28 percent of 1960-64 vegetable-oil production. The cultivated oilseeds, mainly cottonseed, peanuts, soybeans, castorseed, flaxseed, and sesame, accounted for three-fourths percent of production and covered over a million hectares. About 15 percent was extracted from kernels gathered mostly from wild stands of babassu. Brazil also reports production of oil from sesame and sunflowerseed but no area or production of these crops is reported. Some corn oil is produced from the corn-products industry.

Cottonseed follows the distribution of cotton production which is mainly in Sao Paulo and Parana in the South and Ceara, Paraiba, and Pernambuco in the Northeast. Peanut acreage is concentrated in Sao Paulo and soybeans and flaxseed in Rio Grande do Sul.

Castorbeans are produced in the semiarid regions of the East and Northeast and in the humid South. Bahia is the largest producing State, followed by Sao Paulo, Pernambuco, and Ceara. Together, these States account for 85 percent of castorseed production and 98 percent of castor-oil output. Sao Paulo accounted for 21 percent of 1963 castorbean production and 40 percent of oil crushings.

The cultivated palm or noncultivated species are generally harvested in the Northeast. Maranhao harvests most of the nuts of the babassu palm which grows wild over much of the coastal belt. Several similar varieties cover much of the country, and are also classed as babassu in production statistics. Maranhao reported 80 to 85 percent of total output of babassu nuts and 75 percent of oil processed.

Industrial and drying oils were produced from flaxseed harvested as a field crop in Rio Grande do Sul, tung nuts grown as a tree crop in Parana and Rio Grande do Sul, and oiticica harvested wild in the Northeast, mainly in Ceara. Cocoa butter is a byproduct of the cocoa industry in Bahia.

Cultivated oilseeds led the advance in production of vegetable oil; cottonseed declined in relative importance although continuing an absolute increase.

Cottonseed supplied 53 percent of domestic production of edible vegetable oils in 1960-64, down from 57 percent in 1955-59 and 71 percent in 1950-54.

Peanuts supplied 33 percent of 1960-64 edible vegetable-oil production, compared with 25 percent in 1950-54. The area in peanuts about tripled and production nearly quadrupled between 1950-54 and 1960-64, with some yield increases (table 42). Price supports increased in recent years.

Soybeans supplied 12 percent of 1960-64 edible vegetable-oil production compared with 1 percent 1950-54. Soybean production rose from 76,000 tons in 1950-54 to 290,000 tons in 1960-64 (table 43). Production was encouraged by favorable price supports equivalent to $1.68 per bushel for the 1966 crop (table 29). Area increased fivefold, but per hectare yields dropped as area increased.

Output of sesameseed oil has varied; there was a general downtrend from 1,086 tons in 1950-54 to 651 tons in 1960-64. Sunflowerseed oil has been reported only since 1961, averaging 4 tons per year in 1961-63. Corn oil production expanded from 2,020 tons in 1950-54 to 4,683 tons in 1960-64. Further increases in corn oil output are expected due to continued expansion in corn processing facilities.

Castorbean production increased 42 percent between 1950-54 and 1960-64; 1965 output at 355,000 tons was 47 percent above the previous 5-year average but 1966 production apparently was off sharply (table 44). Castor-oil output increased faster than seed production due to virtual cessation of seed exports. Output of oiticica oil has been quite variable, with some uptrend indicated by averages.

There was little effective competition from other crops for productive resources with most of the vegetable oilseeds. However, oilseeds often competed with each other. Peanut yields increased by about one-third and provided a greater net income per hectare than soybeans in Sao Paulo State where 95 percent of the crop is raised. Most other States raised some peanuts, largely as a food crop. Soybean yields declined in Rio Grande do Sul as acreage expanded, but soybeans continued to outproduce peanuts in that area. In both areas, peanuts and soybeans were grown in rotation with corn. Cottonseed production depended on the demand for cotton fiber which was strong in recent years but not as strong as the overall demand for edible vegetable oils.

Castorbeans competed with corn, cotton, and peanuts in Sao Paulo. In the Northeast, castorbeans are frequently planted between the rows of new sisal plantings until the sisal plants attain size and fill in the rows. Castorbeans also can be left for a second and third harvest if conditions warrant. Yield levels and growing conditions are quite different between northern and southern castorbean areas but both have remained competitive and have expanded production. The quantities of babassu and oiticica harvested depend on price and weather. Much of the available crop is not harvested because it is produced in remote areas or there is a lack of economic incentive.

A number of projects are underway for expansion of oilseed processing facilities, particularly in the Northeast. About 400 oil mills were reported in 1964, compared with 342 in 1950 and only 114 in 1940. The increase in processing capacity was probably much greater than the increase in processing facilities.

Expansion of peanuts, soybeans, and castorseed output can be expected to continue upward. The output of cottonseed and other vegetable oilseeds may increase more slowly. Domestic crushing capacity is expected to show continued gains but may not keep up with gains in oilseed production.

Total annual vegetable oil production increased from 212,327 tons in 1950-54, to 289,060 tons in 1955-59, and to 428,256 tons in 1960-64. Based on the output of the first period, production gains were at compound annual rates of 6.4 and 7.2 percent, respectively.

Animal Fats.--Production of animal fats totaled 172,044 tons in 1960-64, or 29 percent of total output of fats and oils.

Butter usually accounts for about one-sixth of the production of the animal fats and the rest is slaughter fat. About 60 percent of slaughter fat is lard and 35 percent tallow. An additional annual production of around 100,000 tons of fat pork in fat equivalent is included under meat production. Official estimates do not include farm production of butter or of farm slaughter fats.

Contrary to what might be expected, reported production of slaughter fats does not parallel the production of meat. Santa Catarina and Rio Grande do Sul together accounted for 36 percent of slaughter weight of hogs but 85 percent of reported lard production. This is due to three factors: Hogs were generally fed to a heavier weight in this area with consequent increase in proportion of fat; the proportion of carcass sold as fat pork rather than lard was greater in other parts of the country, probably because of lower rate of hog slaughter per person; and more lard was saved where slaughter facilities were better. The reported ratio of lard to carcass weight for the country as a whole dropped in recent years:

Period	Lard as a percentage of carcass weight
1950-54	20
1955-59	18
1960-63	17

On the other hand, the ratio of fat pork (used as meat) to carcass weight has increased:

Period	Fat pork as a percentage of carcass weight
1950-54	31
1955-59	33
1960-63	34

Combined fat pork and lard averaged 51 percent of carcass weight in each period. Lard output increased from 78,000 tons in 1950-54 to 84,000 tons in 1955-59, and to 88,000 tons in 1960-64.

Beef carcasses are normally low in fat, due to feeding practices and market preference, and usually little fat is trimmed off. A greater proportion of tallow is reported where slaughter facilities are large, running to over 6 percent of carcass weight in Rio

Grande do Sul and Sao Paulo, compared with 3.5 percent for the country as a whole. Tallow output increased from 44,000 tons in 1950-54 to 51,000 tons in 1955-59 and 52,000 tons in 1960-64.

In spite of the sharp increase in milk production since 1950, commercial butter production showed little change; 24,000 tons were produced in 1950-54 and 26,000 in 1960-64. The peak production of 30,000 tons was in 1958. The 1965 production of 24,752 tons was below the 1960-64 average of 25,768 tons. The tropical climate is not conducive to high production or long storage of butter and farm production is considered to be quite low, compared with similar areas in temperate countries.

Total production of animal fats advanced about 16 percent from 1950-54 to 1960-64, more or less in line with the slow uptrend in meat output. Lard output increased 13 percent and tallow output 19 percent. Slow uptrends are expected to continue.

Total production of animal fats increased from 150,112 tons in 1950-54 to 171,236 tons in 1955-59, and to 172,044 tons in 1960-64. From the first period, annual compound rates of gain were 2.8 and 1.7 percent, respectively.

Output of total vegetable oils and animal fats was 362,439 in 1950-54, 460,296 in 1955-59, and 600,300 in 1960-64. This represented compound annual rates of gain from 1950-54 of 4.8 and 5.1 percent, respectively.

Total production of edible oils and fats, including home slaughter fat and butter output and pork sold as meat, was estimated at 490,000 tons for 1959-61. While output of both total and edible oils and fats is difficult to project in view of the many types, divergent trends, and data limitations, it is assumed that future output will tend generally to keep pace with rapidly increasing domestic demand. Increases sufficient to meet future domestic needs and provide a substantial increase in exports may prove difficult.

Demand:

Brazil maintained self-sufficiency in the supply of edible fats and oils; exports of soybeans and peanuts in most years offset small imports of olive oil and sometimes other vegetable oils. Export has taken most of the inedible oils and oilseeds. In recent years a greater proportion of these inedible oilseeds has been crushed domestically with an increasing proportion of the product going into domestic uses.

Per capita availability of about 7 kilograms annually of both edible and inedible oils, fats, and waxes is low, compared with other Latin American and Western Hemisphere nations (table 45). Edible oil and fat availability, including pork fat, of less than 8 kilograms per capita per year in 1959-61 was well under the comparatively low average for Latin America.

Brazil has no data on actual breakdown between edible and inedible uses of fats and oils, but an estimated 61 percent of total oil and fat output went into edible uses during 1950-1963. In particular, domestic palm oil (both dende and babassu) goes into food (margarine) and nonfood (soap) uses. The largest use reportedly is for soap. About 20 percent of palm oils were estimated to be used for food in 1956-61, either as direct consumption or in margarine.

About two-thirds of edible consumption is liquid fats, primarily cottonseed oil and increasing quantities of soybean and peanut oils.

Cottonseed supplies about one-half of domestic needs, peanuts one-third, soybeans about 7 percent, and corn oil, sesame, and sunflower seed about 3 percent. Because of the climate and the lack of refrigeration, consumption of solid fats is small, except for lard and palm oil. Butter consumption, amounting to less than one-half kilogram per capita per year, is largely used by the restaurant and hotel trade and by upper classes in large cities. Data on margarine production is available only for 1958-61, averaging

9,000 tons for that period--less than one-third the production of butter over the same 3 years. Margarine is reportedly produced largely from babassu, soybean, and low-grade cottonseed oil; it is used mainly by the baking industry.

With an overall low availability of cooking fats and crude slaughter facilities, a good deal of Brazilian meat is sold with very little fat trimmed off. A large part of the pork carcass was sold as pork fat, which is at the same time a cooking fat and a meat component of feijoada. Rendered lard came largely from Rio Grande do Sul, the major hog center. Typically, lard went into food uses and tallow into industrial uses; however, small amounts of both lard and tallow showed up in opposite classifications. About two-thirds of slaughter fats were classed edible and one-third inedible in 1963.

Per capita availability and disappearance of fats and oils increased rapidly. Consumption trends for edible fats largely followed production trends. Consumption of slaughter fats gained less rapidly than that of vegetable oils, and their share of the total dropped from over half of edible fats and oils in 1950-54 to about one-third in 1962 and 1963; a further decline seems likely.

The strong growth in demand for animal and vegetable fats for soap making and other industrial purposes continues. A switch to a petroleum-base detergent has not yet progressed in Brazil to the degree evident in the United States. Nonfood uses of fats and oils will probably gain at least as fast as food use in the future.

Consumption of edible oils and fats, including allowances for farm output and pork fat, totaled 490,000 tons in 1959-61. Very rapid increases have been evidenced since then and future demand will likely severely tax production resources.

Trade:

Exports of vegetable oils and oilseeds averaged $30.3 million per year during 1960-64 (table 10). Exports of animal fats and oils were negligible. At the same time, total imports of fats and oils averaged $9.0 million per year (table 11).

Castorbeans and oil made up 60 percent of the value of oil exports and oilseeds in this period; edible vegetable oilseeds (mainly soybeans and peanuts), 22 percent; oiticica oil, 11 percent; and other vegetable oils (mainly inedible), 7 percent. Processing capacity progressed to the point where exports of inedible oilseeds practically ceased. On the other hand, increased exports of edible oilseeds resulted from the expansion of production, particularly of peanuts and soybeans, more rapidly than both processing capacity and domestic demand for edible oils.

Imports during 1960-64 were mainly olive oil, valued at $5.9 million. Other edible fats and oils imports averaged $3.1 million annually and consisted largely edible tallow from Argentina and cottonseed, soybean, and peanut oils from the United States.

Exports of fats, oils, and waxes totaled 73,123 tons in 1955-59 and 121,777 tons in 1960-64 (table 45). In 1964, Brazil accounted for 57 percent of world castor-oil exports--70 percent of Brazil's 1960-64 production was exported. Exports averaged 50,000 tons of beans in 1950-54 and 30,000 tons in 1955-60. Since 1960, exports of unprocessed castorbeans have been negligible. Oil exports (increased from 23,000 in 1950-54 to 76,000 tons in 1960-64 (table 46). Seed equivalent of both beans and oil exports increased about 67 percent--from 102,000 tons in 1950-54 to 170,000 tons in 1960-64. Export of oiticica seed is prohibited; oiticica oil exports fluctuated somewhat, averaging 7,000 tons in 1950-54 and 12,000 tons in 1960-64. Tung oil exports tripled between the same two periods, averaging only 650 tons, however, in 1960-64. Tung nut exports were not reported.

Brazil has exported and imported small quantities of cottonseed oil but has not traded in cottonseed as such. Exports of cottonseed oil increased from a negligible amount in 1955-59 to 1,364 tons in 1960-64; imports totaled 502 and 3,479 tons for the same periods. As domestic surpluses of soybeans increase, Brazil may export more cottonseed oil and use the cheaper soybean oil at home.

Average soybean exports grew from 28,000 tons in 1950-54 to 34,000 tons in 1960-64. Prior to 1952, the bulk of Brazil's soybeans were exported and even in 1961 and 1962 over one-fourth of production was exported. Exports fluctuated according to domestic production and demand; none was exported in 1960 and 1964, but 1962 exports totaled 82,000 tons. Soybean oil exports were negligible, while imports totaled 2,770 tons in 1962, 1,368 tons in 1963, and 2,352 tons in 1964, largely P.L.-480 shipments from the United States. Prior to this little or none was imported.

Peanut exports, including small amounts of oil (in peanut equivalent), increased from 1,000 tons in 1950-54 to 18,000 tons in 1960-64. Exports have fluctuated; there were no exports in 1960 or 1964 (table 42). Exports of peanut oil have been negligible, except for 8,419 tons in 1963; there were none in 1964. Imports of peanuts and peanut oil have been negligible. Continued growth of exports of peanuts and peanut oil is expected.

Exports of both babassu oil and nuts are variable. Exports of nuts totaled 12,582 tons in 1951 and 9,268 tons in 1962, but averaged only 1,300 tons for the intervening years. Exports of babassu oil declined rapidly after World War II and were generally negligible in 1952-62, but totaled 12,134 tons in 1951 and 6,151 tons in 1963.

Total fats and oils imports averaged 22,473 tons in 1960-64, up from 11,736 tons for the previous 5 years (table 46). Unitl 1963, most was olive oil, which Brazil produces in very small quantity, and for which import demand has remained fairly stable. Imports averaged 8,811 tons for 1950-54, 7,640 tons for 1955-59, and 9,491 tons for 1960-64. Imports of lard were sizable in 1952-57, but little came in from that time until 1964. Butter imports have been negligible in most years; however, 1,889 tons were imported in 1958, 2,902 tons in 1963, and 7,965 tons in 1964, mostly under the Food for Peace Program.

An average of 1,000 tons of palm oil was imported each year up to 1957 for use in the tin plating industry; domestic oil was considered unusable for this purpose. Tallow imports which were negligible in earlier years reached 2,344 tons in 1963 and 15,843 tons in 1964. Imports in 1964 were valued at $2.8 million--all from Argentina, Uruguay, and Paraguay. Earlier, import regulations had not permitted imports of vegetable oils or tallow for use in the domestic soap industry and had encouraged the use of higher priced domestic substitutes. Tallow accounted for 5 percent by value of 1964 agricultural imports. Fats and oil imports reached a peak of 57,813 tons in 1964, more than the total amount imported in the previous 4 years.

Imports of animal fats totaled 28,661 tons in 1964, made up of 15,843 tons of tallow, 3,765 tons of lard, 7,965 tons of butter, and 1,088 tons of other types, including marine oils. The sharp uptrend in imports was due to shortfalls in domestic production, due to adverse weather. U.S. P.L.-480 shipments accounted for a large share of the increased imports as also did higher tallow imports from Argentina.

LIVESTOCK AND LIVESTOCK PRODUCTS

Animal products provided 15 percent of total calorie consumption and 29 percent of protein consumption (including slaughter fats and butter) in the Brazilian diet and over a fourth of the value of gross agricultural production in 1959-61 (33). Principal products (in order of farm value) were meat, milk, wool, and eggs. Additions to the herd were also important.

Red Meat:

Total Production--Red meat production in 1965 totaled over 2 million tons (table 24). Of this total, nearly 70 percent was beef, 28 percent pork, and 2 percent, sheep and goat meat. This total includes estimates for farm and unrecorded slaughter. In addition, offal products, small amounts of game, and water buffalo and other domestic animals add an estimated 5.5 percent to red meat production.

Brazilian livestock production is still relatively undeveloped, with greater attention being given to numbers than to improved management and breeding. Reported cattle numbers at 91 million in 1965 exceeded the human population; hogs numbered 63 million and sheep about 22 million. The reported offtake in terms of slaughter and increases in herd numbers is relatively low, averaging 14 percent of the domestic herd for cattle in the 1950's, 20 to 25 percent for hogs, and 12 percent for sheep.

In 1962, the Government proposed to double meat production by 1970, and a Brazilian study published in 1964 forecast the possible tripling of meat output between 1960 and 1970 to 6.4 million tons and a possible 12.0 million tons by the year 2000 (23). The study also saw a possible doubling of cattle numbers between 1960 and 1980 and a tripling of slaughter with some increase in slaughter weight per animal. These together would provide 4.6 million tons of beef in 1980, compared with 1,359,000 in 1960. Meat production trends so far indicate that these projections are highly optimistic.

Red meat production (beef and veal, pork, and sheep and mutton) increased from 1.53 million tons in 1950-54 to 1.97 million tons in 1960-64, or at a compound rate of 2.5 percent annually (table 24). Comparable rates of increase by types were 2.1 percent for beef and veal, 3.7 percent for pork, 1.7 percent for mutton, and 3.9 percent for goat meat. Production trends continue to lag sharply behind domestic demand.

Beef and veal output is the product of large numbers and low productivity. The 1963 cattle inventory was valued at $3.8 billion by DE. Beef production averaged 10 percent or more of the value of agricultural production. According to the 1960 census, about half the country's total cattle numbers were held in three States: Minas Gerais with 11.9 million; Rio Grande do Sul with 8.7 million; and Sao Paulo with 7.2 million. Another 15 million, or 27 percent of the 1960 census total of 55.7 million, were in three additional States: Mato Grosso, Goias, and Bahia. (Brazilian statistics do not differentiate between beef cattle and dairy cattle.) Slaughter was more highly concentrated; Sao Paulo alone slaughtered one-third of the nation's cattle, and with Rio Grande do Sul and Minas Gerais, 58 percent.

Zebu stock increased in Brazil since World War I and is gradually replacing the "creole" mixed cattle of colonial origin, with low productivity. Zebus now predominate over most of the country both for beef and for dairy production. Most beef animals are Zebu-creole crosses and dairy cattle are Zebu-dairy breed crosses. European breeds predominate in the southern temperate zone, but few are found elsewhere; creole cattle reportedly disappeared 50 years ago in that area. Creole cattle are still plentiful in the North and Northeast. In the North, some Red Zindis are used for dairy purposes.

Beef cattle are produced mainly on large establishments and are sold grassfed from range or finishing pastures. Sao Paulo and Bahia are major finishing States, bringing in cattle from less productive range pastures for finishing on cultivated pastures. Cattle grow slowly and are rarely marketed under 4 years old. Gains during the wet season are followed by considerable weight loss during the dry season and frequent drought. Supplemental and dry season feeding are practically unknown and almost no dry season forage is put up as hay or silage.

Cattle slaughter is highly seasonal. Those plants reporting monthly slaughter show May and June slaughter about double the average for October and November. Seasonality of slaughter is evident in all States but is most pronounced in Rio Grande do Sul where slaughter in May and June may run 5 to 10 times the level of slaughter in September and October. Fluctuations may not be as wide in smaller plants that report slaughter once yearly only.

To provide for seasonal shortages and the general lack of refrigeration, a considerable portion of meat, particularly in Rio Grande do Sul, is dried.

DE estimates of numbers on hand are available by States and municipalities which refer to total cattle of all ages. The census carries separate estimates for animals on farms and animals not on farms by age and sex classifications (table 47). The official series of estimates of cattle numbers is not consistent with cattle numbers reported by the Agricultural Census nor with estimates of slaughter (table 25). In many States, differences are even more extreme than for the country as a whole. According to the census, cattle numbers advanced 8.8 million head or 19 percent between 1950 and 1960, while DE shows a more rapid increase of 21.3 million or 40 percent. Over the same period slaughter increased 21 percent (table 26).

Estimates of cattle numbers show an unbroken uptrend since World War II. Estimates of slaughter, however, have fluctuated somewhat, with a general strong uptrend to 1958 followed by a downturn to 1963 and apparent leveling off since that time somewhat below peak levels. Slaughter estimates are fairly detailed and reasonably complete.

Based on DE statistics, the offtake ratio, which includes additions to the herd along with slaughter, fell from 14.5 percent of numbers on hand during the period 1950-54 to 12.2 percent in the period 1960-64. This appears to be in part a statistical rather than actual drop, however, due to an apparent overestimating of cattle numbers and the possibility of some underestimating of slaughter.

Because of low productivity and continually increasing cattle numbers the ratio of slaughter to total cattle numbers was about 13 percent, according to the 1940, 1950, and 1960 censuses. On the basis of official estimates the ratio was somewhat less: 11.9 percent in 1940, 11.3 percent in 1950, 9.7 percent in 1960, and 8.8 percent in 1963.

The calf crop (based on calves on hand under 2 years of age and estimated calf slaughter from 1950 census data) averaged about 40 percent of cows and heifers on hand or 18 percent of total herd numbers (table 48). Farmers reported more calves 1 to 2 years old than they did calves under 1 year, due either to misreporting of ages or to a lower calf crop or both. The average of all calves under 2 years, plus reported calf slaughter, appeared to give a better indication of calving rate than did the reported number of calves under 1-year old. The calving rate would have been somewhat higher if death losses of calves during their first 2 years could be included. There is little slaughter of heifer calves and regulations generally prohibit slaughter of female animals before they are 5 years old.

An average gross offtake of about 18 percent (table 48) and an average net offtake ratio of 14.5 (table 26) suggests that death loss of mature animals might average 4 to 5 percent a year. This seems low, in view of the reported high incidence of aftosa and other cattle diseases over Brazil; some estimates ranged as high as 30 percent losses including, however, both death losses and weight losses in surviving animals.

For the country as a whole, carcass weights of slaughtered animals averaged 192 kilos per head in 1960-64, up from the 189 kilos for the previous 5 years and 181 kilos in 1950-54. The increase appears to be due largely to slaughter of a greater proportion of steers in the later years. The spread of cattle numbers and slaughter towards the South and Central West also is leading to an overall increase in slaughter weight due to somewhat better breeding and pastures in these regions. Average carcass weight varies considerably over the country, averaging about 140-145 kilograms in the North and Northeast, 180-185 kilograms in the East and Central West and about 205 kilos in the South. The age of steers slaughtered reportedly ranges mostly from 4 to 6 years.

Because high world prices have frequently led to excessive slaughter and depletion of breeding herds, Brazil imported meat in 1952-54. Brazil's position as a residual supplier in world markets is a result of a low level of management. Extensive range areas enable herds to build up gradually with little management investment, eventually to be sold at a profit on cyclically high world prices. The Government's policy of export quotas and the export tax levied in 1965 to hold down living costs and increase domestic meat consumption interrupted this cycle and restrained beef exports at a time of high world demand. Controls were relaxed in 1966 and prices have improved.

With increased domestic demand and less ability to capitalize on recurring high world meat prices, Brazilian producers may pay more attention to production costs and attempt to increase marketing during the high prices that prevail during the dry season.

Improvements in production and marketing should work toward a leveling of seasonal production peaks. Rapid changes in transportation are bringing about increased competition between grass-fed range cattle and cattle finished on improved pasture and in feedlots in more intensive production areas. But improved pastures offset some advantages of improved transportation from distant rangelands.

The Government's attempts to restrict consumer prices in a period of strong demand and short supplies of meat have not contributed to increasing meat supplies nor to long-range investment in livestock production. Brazil needs to make significant improvements in management techniques, particularly range and pasture management, and to improve calving rates, growth rates, and offtake ratios. Progress in these directions is slow and will depend upon long-range pricing policies of the Federal Government.

Pork production reaching 575,000 tons in 1963, was less than half of the volume of beef output. Seven States--Minas Gerais, Parana, Rio Grande do Sul. Sao Paulo, Santa Catarina, Goias, and Bahia--reportedly accounted for 74 percent of the 1963 hog numbers. Maranhao and Mato Grosso are the next in importance with the remainder scattered rather widely. Rio Grande do Sul reports nearly a third of hog slaughter and, together with Sao Paulo and Minas Gerais, 55 percent.

Creole types predominate. Improved European and North American breeding is evident in the main hog producing areas of the South where half or more of hogs sent to slaughterhouses are recognized breeds or their crosses with the native creole.

Hogs are generally allowed to forage or are fed farm waste. Disease, parasites, and nutritional deficiencies are prevalent, resulting in slow growth and high death losses. Hogs reportedly take an average of 14 months to attain slaughter weight (average dress-out of 67 kilos), compared with 6 months to reach the same weight in the United States. A corn-hog economy exists in Rio Grande do Sul, Santa Catarina, and parts of Parana, but even here there is little feeding of supplements. Ingredients for effective feeding are potentially available in Brazil and the ratio of feed prices to hog prices is said to be favorable for continued expansion in hog feeding. Improved management, with particular emphasis on disease and parasite control, will be necessary to increase the low average number of pigs weaned per litter.

Brazil's hog numbers reportedly more than doubled between 1950 and 1963 (table 27). At the same time hog slaughter increased by only 59 percent. Judging from slaughter data and a reasonable growth in the breeding herd, a level of about 41 million hogs in 1963 appears more reasonable than the 56 million estimate of DE for 1963.

Hog raising is a complementary enterprise on most farms having hogs. Where corn output can be expanded, hog output also may increase. While market prices for corn have been favorable, hog prices have also been satisfactory. The problem and expense of storage and transportation in exporting corn should continue to leave ample supplies available to expand domestic hog output.

Most hogs are sold to packer-buyers or direct to processing plants. The northeast corner of Rio Grande do Sul in the upper basin of the Uruguay River reportedly comprises the biggest pork processing center in South America. Farm and other slaughter accounted for 62 percent of hog slaughter, municipal plants for 30 percent, and commercial slaughter plants for only 8 percent. The low ratio of slaughter to reported numbers on hand (15 to 20 percent) is due to several factors--small litters and slow growth rates, probable overstatement of numbers on hand, and possible underreporting of slaughter. Besides ham, bacon, and fresh pork, about 18 percent of carcass weight produces lard and 33 percent fat pork.

Sharp uptrends in corn supplies, particularly in western Parana, point to probable continuation of strong uptrends in hog numbers and commercial slaughter. Overall average slaughter weights are likely to increase as the proportion of corn-fed hogs increases. Pork output is expected to grow at a more rapid rate than beef and present price ratios favoring hogs may well decline as hog output increases.

The total value of sheep and goat output accounts for only an estimated 2 percent of farm value of output of all livestock and livestock products. The sheep industry is concentrated mainly in the range areas of Rio Grande do Sul. That State reports 55 percent of Brazil's 21 million sheep, 29 percent of sheep slaughtered, and 37 percent of carcass weight of mutton. In the main sheep area, European breeds predominate, mainly dual purpose Corriedale and Romney Marsh breeds which yield mutton and medium staple wool.

Bahia and Pernambuco together are the next most populous sheep area. In the Northeast, sheep are kept only for production of mutton and sheep skins; creole types predominate. In the South, sheep use range that can also be used by cattle, depending on relative profitability.

Goat breeding is centered in the Northeast and the northern part of the East. Goats are important sources of meat and milk in those areas and skins are sold for export. In the dry scrubby areas of the Northeast, goats use poor forage land that is of little use to other livestock.

Meat Demand--Domestic consumption takes over 97 percent of total meat output in most years. A 1961 survey of consumer expenditures in Rio de Janeiro found that over one-third of the total food budget went to meat and fish. On the average, fresh meat took 25 percent of total food expenditures, processed meat 4.2 percent, and fresh and processed fish, which competes with meat, 4.6 percent.

For the whole country, meat alone supplied almost 8 percent of calories and nearly 17 percent of protein consumption in 1959-61 (33). Meat consumption generally has a strong correlation with per capita income and usually averages higher in urban than in rural households. Meat consumption also is higher in surplus production regions, such as Rio Grande do Sul, and lower in deficit regions such as the Northeast.

An FAO study, based on reported slaughter, showed that per capita meat consumption between 1948 and 1960 ranged between 25.9 and 29.4 kilograms, with the high in 1958 and the low in 1955; most years averaged between 27 and 28 kilograms, with no discernible time trend (30). For 1960, total meat consumption was estimated by another study at 43.3 kilograms per capita per year in urban households, 4.8 kilograms in rural households, with a countrywide average of 22.1 kilograms (23).

In a more comprehensive study for 1959-61, average meat consumption was estimated at 28.8 kilograms per capita--19.0 kilograms of beef and veal, 7.0 kilograms of pork, and 2.8 kilograms of other meat (33). Other meat included 0.6 kilogram of mutton and goat, 0.6 kilogram of poultry, and 1.6 kilograms of other meat and offal. About three-fourths of meat output was consumed fresh; 16 percent was refrigerated and the rest preserved by drying, canning, or other means. Charque (dried meat) accounted for about 6 percent of beef consumption, as well as smaller amounts of pork and mutton consumption. This study included both reported and estimated unreported home slaughter and showed a distinct decline in per capita meat consumption between 1956-58 and 1959-61. This was due to slaughter rates lagging behind the rate of population growth and to some increase in meat exports. Total meat supply increased slightly since 1956, but per capita availability declined an average of about 2 percent per year. Domestic availability of beef and veal remained practically unchanged at 1.3 million tons since 1956 while per capita availability declined from 21.3 kilos in the period 1956-58 to 17.0 kilos in 1964. On the other hand, pork supplies increased at about the same rate as population to maintain a per capita availability of about 7.0 to 7.5 kilograms per capita. Supply of other meat declined from 3.7 kilograms per capita in 1956-58 to 2.8 kilograms in 1959-61, with trends probably upward since that time.

From the standpoints of location and slaughter capacity, slaughtering facilities are generally sufficient. Many plants, however, need modernization, increased efficiency, and improved sanitary standards to provide a better product at competitive prices. Until transportation is more fully developed and more refrigerated facilities are available, market demand will continue to prefer fresh over refrigerated meat and shipping live cattle long distances to slaughter will probably remain more practical than shipping meat. Some meat, however, is refrigerated and stored to ease the critical dry season when slaughter is greatly reduced.

The livestock industry is relying more on growing urban demand rather than relatively unstable export potentials for its profits. Domestic price controls and other Government regulations, along with inflation, have generally been harder on the foreign-owned large slaughter plants (frigorificos) which have been oriented to the export market. The quantity of meat handled by these firms declined from 26 percent of the total in 1947 to 15 percent in 1963, and from peak slaughter of 1.5 million head in 1959 to less than 1.1 million head in 1963.

The Government frequently instituted either minimum producer prices on livestock or maximum retail prices on meat or both, particularly during the dry season when meat prices are unusually high. Slaughterers complained that they cannot afford to slaughter under the narrow margins allowed and occasionally some of the major packers closed down temporarily or permanently.

The Government customarily supplies credit for storage of beef carcasses to improve supplies during the dry season. Credit availability has been quite variable and some credit reportedly has been diverted to speculative buying of livestock. Government price policies probably inhibited rather than stimulated beef production.

Fresh meat in Brazil's retail markets cost two and one-half times the price of bread (596 cruzeiros per kilogram for meat compared to 234 cruzeiros per kilogram for bread), and roughly 50 cents a pound at the free exchange rate prevailing at that time (12, June 1964). The price relationship of food products of animal origin (mainly meat) to food products of vegetable origin varied widely as the following tabulation, based on indices of wholesale food prices, shows (10). Prices of animal products as a percentage of prices of vegetable products (excluding coffee) was reportedly as follows (1953 = 100):

1947-50	77	1960-62	147
1951-55	111	1963-64	128
1956-59	98	1965-66	150

A relative rise in the price of beef and a lag in beef output accompanied the decline in beef consumption between 1956-58 and 1959-61. A buildup in herd numbers in response to higher beef prices and speculative holding of cattle as a hedge against inflation probably caused the decline in slaughter since 1959.

As the economy stabilizes and a long-term Government meat policy is reached, market prices may be more attractive and slaughter rates may increase. Per capita meat supplies may reach their previous level or at least begin an uptrend. Both foreign and domestic demand was strong, but domestic price policies did not permit higher prices under orderly market conditions. As a result, growers and packers sought ways to circumvent price controls, and lagging production held back supplies. Pork output gained, relative to beef, but relatively higher prices for pork than for beef kept pork consumption from expanding even more rapidly. As a result of changing production and marketing techniques and consumption habits, pork may become more competitive with beef in price, and continue relative gain.

Total meat supplies for domestic use were estimated at 2.03 million tons for 1959-61. Domestic needs are projected at 3.11 million tons for 1970, an increase of 53 percent (table 9). Based upon recent production trends, supplies will not be available to meet this need and either consumption will be reduced, other foods will be substituted, imports will be required (rather unlikely), or a combination of these adjustments will be necessary.

Meat Trade.--Brazil is a net meat exporter; exports averaged $18.3 million in 1960-64, or 1.4 percent of Brazil's total exports, and imports for the period were negligible. Brazil's exports averaged 1 to 2 percent of world meat trade. On a carcass weight basis, exports averaged 31,000 tons in 1960-64, less than 3 percent of total meat output. These exports were made at the expense of domestic needs.

Almost all meat exports were beef. Composition of exports varied widely from year to year, but averaged nearly two-thirds canned; most of the rest was frozen but some was fresh and chilled. The bulk of the canned meat moves to the United States and the frozen meat to Europe. U.S. regulations prohibit the import of uncooked meat from countries that are not aftosa-free.

Brazil has exported and imported meat in most years since 1914. Exports fluctuated quite widely, with peaks of 118,800 tons in 1930, 150,159 tons in 1940, and 65,852 tons in 1959. (On a carcass weight basis, 1959 exports totaled 86,332 tons.) Imports have been small and declining, averaging to 4,300 tons in 1950-54, less than 500 tons in 1955-59, and less than 50 tons in 1960-64. Peak imports totaled 9,551 tons in 1952.

Exports come mainly from Rio Grande do Sul and Sao Paulo. Export quotas are set each year with separate quotas for Rio Grande do Sul and for the rest of Brazil. The Government licenses plants for meat exports. In 1963, 27 plants were licensed: 14 in Rio Grande do Sul, 8 in Sao Paulo, and 5 in other States. Quantities for export are regulated by the Federal Government in relation to domestic requirements. In 1964-65, the Government imposed an export tax of 20 percent on Rio Grande do Sul meat and 30 percent on meat exports from the central area to keep domestic prices from rising and to prevent excess profits to exporters.

With the growing world demand for fresh meat, Brazil could develop a larger export market for meat. However, supply and domestic demand will restrict the growth of Brazil's meat exports. Price and quality factors may further limit Brazil in competition with Argentina and Australia, the major meat exporting nations.

In 1962, the Government proposed to develop a million-ton meat export surplus in 1970 by doubling meat production. In view of progress to date, however, it appears unlikely that target production and export levels will be even approached, particularly for cattle. Brazil may not be able to provide for its own population and increasing per capita consumption in the near future.

MILK

Although consumption of dairy products is low, compared with that in the Northern Hemisphere, production has made exceptional progress since 1950. Growth has been at the expense of commercial imports which now is largely excluded from the Brazilian market.

Production:

Milk production accounted for an estimated 10 percent of the value of agricultural output in 1960-64. Average production of 5.4 million tons over the period was less than 10 percent of U.S. output (table 24). About 8 percent of total production was pasteurized, and about the same amount was manufactured as dry and canned milk (table 49). A small amount was used to produce butter and cheese in inspected plants, and the rest was uninspected.

About 12 million cows being milked was the unofficial estimate in recent years. Commercial dairy production is expanding, with dairy herds replacing beef cattle, especially near cities. The most important dairy farming and fluid milk supply area consists of the parts of Minas Gerais and Sao Paulo States serving the cities of Sao Paulo, Rio de Janeiro, and Belo Horizonte. Minas Gerais produces about one-third of the country's milk and Sao Paulo about one-fourth. Most milk production in the Northeast and Rio Grande do Sul is converted into cheese, curd, and butter. Milk yields are low, but returns are high enough to cover the low labor costs. Most dairy farms reportedly have a daily output of less than 50 liters (about 12 gallons).

The dairy industry expanded with modern equipment and tripled its production of pasteurized, powdered, and canned milk between 1950-54 and 1960-64. Pasteurized milk, to a certain extent, replaced the use of raw milk as the commercial dairy industry expanded into new consumption centers. The manufactured milk industry, encouraged by trade restrictions, expanded to utilize excess supplies, particularly those of a seasonal nature. Some large dairy farmers moved to more remote areas where production costs are low in order to produce milk for manufacturing.

Total milk production is estimated to have doubled from 2.5 million tons in 1950 to 5.0 million tons in 1960, although some feel this amount exaggerated. While 1960 census data are not yet available, the 1950 census showed production of 2,835,000 tons in 1949--19 percent higher than DE estimates of 2,374,000 tons. Publication of DE data began in 1956 and estimates shown in the FAO livestock study for 1948-55 may have been derived by working back from these amounts (30).

Comparing DE estimates for 1959 with census output for 1949 shows a 69 percent gain over the decade, compared with an indicated gain of 102 percent using DE data alone. Comparing the 1960-64 output of 5.4 million tons with the 1950-54 level of 3.1 million tons shows an apparent growth of only 74 percent for the decade. Preliminary reports for 1965, however, indicate a further sharp increase in output.

Less than a fifth of total milk production enters commercial channels. The fresh equivalent of inspected commercial output of cheese and pasteurized, powdered, condensed and evaporated milk increased 159 percent from 366,000 tons in 1950-54 to 948,400 in 1960-64 (table 49). The residual between total and inspected products indicates a 65-percent increase in noninspected production. This may be high. Production and consumption of pasteurized and powdered milk probably cut into production and consumption of raw milk. Production also expanded faster where the stimulus of inspected marketing facilities was greatest. These are reasons for doubting whether noninspected production indeed increased as fast as indicated.

Dairy farming has been encouraged by both the National Dairy Farming Commission and the Commission of Assistance to Farming and Cattle Raising Production to build up the exhausted land in many parts of Sao Paulo State. Dairy production received some stimulus from an increasing need for permanent farming system on good lands close to the main market centers. Depending on commodity and land prices, dairying will compete with production of meat animals and also with the same crops that complement dairy output by benefiting from the manure, including coffee, cotton, and fruits and vegetables. The growth of markets and marketing facilities probably provided the greatest incentive to production, but prices were also important.

Production is expected to continue an uptrend, due both to increasing numbers of cattle of improved dairy breeds and increasing output per head. The rate of increase in milk production is highly dependent on price support policies for crops and retail price controls on milk and meat. Recently, these did not favor milk as much as during the earlier period. In 1965, however, milk production reportedly expanded by 8 percent, due, in part, to more favorable weather but this may portend a further period of increasing milk output.

Demand:

Domestic demand takes all of domestic output and imports equivalent to about 1 percent of output. Per capita consumption in cities may not be much higher than the rate in the countryside. A study conducted in 1957 by the National Dairy Farming Commission found that the bulk of fluid milk was still consumed raw in small towns and rural areas or was converted to cheese and butter in noninspected plants or in rural areas (30).

Brazil has three grades of pasteurized milk--A, B, and C. Grade C milk (comparable to Grade B in the United States) accounts for the bulk of Brazil's pasteurized milk consumption.

In 1960, the Livestock Products Inspection Division (DIPOA) of the Ministry of Agriculture had over 100 milk plants and nearly 900 collection centers and depots under Federal inspection; about 90 percent of them were in the States of Minas Gerais, Sao Paulo, and Rio de Janeiro. Due to the poor sanitary standards and the lack of refrigeration, powdered and condensed milk are preferred in many areas both for flavor and keeping qualities. Dairy product imports have been mainly powdered milk from the United States under the Food for Peace Program.

Judging by production statistics, average per capita consumption increased by 50 percent from 48 kilos per capita in 1950 to 71 kilos milk equivalent in 1960. Per capita consumption of fluid milk in the 22 State capitals, representing 80 percent of the urban population, however, reportedly declined 6 percent. Some fluid consumption has been replaced by use of powdered milk, which has increased about fivefold in the period. Statistics show that consumption of pasteurized, powdered, and canned milk more than doubled from an equivalent of 2.4 million liters in 1950 to 5.0 million liters in 1960. Dairy product consumption per person increased from 105 to 113 calories between 1956-58 and 1959-61 (33).

In spite of the strong increase over the decade, per capita dairy products consumption was only about one-half the consumption level of Chile or Argentina and one-fourth the U.S. level. Large purchases of powdered milk for school lunch programs and charitable donations from the United States resulted in an increase in consumption in low income families.

No great seasonal variation in price (and consequently in consumption) was apparent in fluid milk destined for large towns. This was attributed to price fixing and to the availability of markets for surplus milk for butter and cheese production. Unregulated butter and cheese prices tended to drop during the rainy season and to increase again during the dry season.

Milk has high income and price elasticities of demand. Milk consumption increased more rapidly than most other major commodity groups between 1956-58 and 1959-61. This was partly due to the maintenance of retail price controls which kept the price of milk low relative to average food costs. During periods of stable milk prices and rising incomes milk consumption tended to increase rapidly, and when milk price increased, consumption decreased. The opposite effects, although less immediate, were apparent on milk supplies because dairying has been alternately profitable and unprofitable.

Continuance of obsolete marketing methods and lack of refrigeration tends to slow the progress of fluid milk consumption and spurs the use of powdered milk. Improving quality and better market organization will encourage the demand for fresh milk, although increased consumption is highly dependent on price levels and market regulations. To expand consumption, increased output at prices favorable to producers will need to be at prices consumers are willing to pay.

The continued rapid expansion of demand expected will require accelerated output over recent trends. Considering that such production trends have shown very rapid gains, it is unlikely that projected demand will be met by domestic output.

Trade:

In the prewar years Brazil was both an exporter and an importer of dairy products; importing powered and condensed milk and exporting butter and cheese to some areas of neighboring countries. In the postwar years, dairy imports increased rapidly; in 1957; $6.7 million worth of dry milk was imported along with relatively small imports of other dairy products. Since 1958, imports of dairy products have practically ceased, except for powered milk and other imports from the United States as gifts or nondollar concessional sales for the Government school lunch program. In 1963, imports of butter and cheese reached a total of $3.7 million, practically all from the United States under the Food for Peace Program for school lunches or charitable donations. Brazil can be considered to be out of the world market as far as commercial trade is concerned.

Imports of powdered milk averaged 13,200 tons 1960-64, up 74 percent from the previous 5-year average and 238 percent above 1950-54 imports of 3,900 tons. Imports of butter and other dairy products show similar rates of increase for the 5-year periods but have actually been quite variable. High levels in some years under P.L.-480 accompany a general downtrend in commercial imports. In 1964, butter imports totaled 7,965 tons, and in 1963, 2,902 tons, compared with virtually none imported during the preceding 4 years, and 1,889 tons in 1958. Other dairy imports, mainly cheese, totaled 2,191 tons in 1963 compared with only 1,590 tons in total for the remaining 14 years since 1950.

Imports of dairy products are unlikely to increase unless the Government changes both import and production policies to permit low-cost foreign producers to compete with Brazilian producers. Expansion of relief and charity shipments from the United States is uncertain and dependent upon both U.S. and Brazilian Government policies.

The United States and other countries are unlikely to share in the growth of the Brazilian market for dairy products even though U.S. powdered milk at concessional prices has done much to develop the market. Even such low-cost producers as Denmark and New Zealand are kept out of the Brazilian market through import restrictions, as Brazil intends to cover internal market needs from domestic production. Encouragement of continued rapid expansion of Brazil's dairy production is in accord with the Government's program for agriculture, industry, and nutrition. In spite of a milk deficit indicated for 1970, commercial imports of any significance are highly unlikely.

POULTRY

Production:

Egg production, valued at $188 million in 1963 (converted at the average trade exchange rates), was probably more important than production of poultry meat. Reported 1963 poultry slaughter, valued at $9 million, accounted for perhaps 15 percent of total poultry slaughter, indicating that the total value of poultry slaughter was about $60 million. The inventory of hens in the same year was valued at $127 million and total poultry numbers at $223 million. Poultry numbers in 1963 totaled 219 million--57 percent hens, 38 percent roosters and young chickens, about 2 percent turkeys and 3 percent ducks and geese.

Poultry raising is still predominantly a small barnyard type of production with about 209 million chickens, 3 million turkeys, and 7 million ducks and geese on hand in 1963. Several U.S. firms are operating hatcheries in Brazil, using established U.S. breeding lines. Large-scale production of improved breeds for both eggs and broilers is making considerable headway in various parts of the country, particularly in Sao Paulo, which produced 19 percent of Brazil's poultry. Minas Gerais with 18 percent, Parana with 11 percent, and Rio Grande do Sul and Sao Paulo with 9 percent, produce 57 percent of all poultry.

Poultry numbers reportedly expanded 78 percent between 1952 and 1963, with the greatest growth in broiler numbers. Earlier data is unavailable. Reported poultry slaughter doubled, from about 3.8 million kilograms in 1952 to 7.9 million in 1963; this is probably a greater increase than is true for unreported poultry slaughter. Official slaughter estimates omit farm slaughter and slaughter of hens purchased live for home killing, still a customary way of ensuring fresh poultry meat.

Egg production at 573 million dozen in 1960-64 (313,000 tons) increased an estimated 80 percent from 1950-54 level of 320 million dozen (173,000 tons; table 24). Increased feed supplies and improved breeding and commercial facilities indicate a continued uptrend in output of poultry and eggs. While egg production trends are inadequate in terms of projected demand, supplies should gain with the increased supplies of feed likely and development of commercial output.

Demand:

Poultry meat and eggs together comprised only 17 calories per day, or 0.6 percent of total calorie consumption and 2 percent of total protein consumption in 1959-61--15 calories from eggs and 2 calories from poultry meat. Production and consumption were virtually the same, with few or no exports or imports. Consumption data were extremely limited.

Per capita availability was equivalent to about 0.6 kilograms of poultry and 91 eggs per year 1960-64. Sao Paulo State reported 120 eggs per capita consumption. Per capita egg availability increased 31 percent from 1950-54 to 1960-64, and probably about the same rate for poultry meat. Continued growth in per capita consumption of both eggs and poultry is expected.

Trade:

Brazil's foreign trade in eggs, live poultry, and poultry meat is negligible. Imports of hatching eggs averaged just 555 kilos in 1960-64, practically all from the United States. There were no other reported imports. Exports of dried eggs averaged 14 tons per year for the same period and there were no exports of shell eggs except for 228 tons shipped to Italy in 1964. Hatching egg imports are limited to breeding stock and will continue to be minor. Other poultry and egg imports are unlikely. The availability of further export surpluses of shell and dried eggs will depend on growth rates in production and domestic demand which are not clear. However, any increase in exports is likely to be insignificant in terms of world poultry trade or Brazilian agricultural trade in the near future.

OTHER COMMODITIES

In addition to the food crops already discussed, Brazil produces and consumes small amounts of other grains--oats, barley, and rye; and tree nuts--Brazil nuts, coconuts, and cashew nuts. Brazil nuts are an important export.

Barley and malt, largely used by the brewing industry, are discussed under other nonfood crops.

Oats:

Brazilian production of oats generally averages less than 20,000 tons, largely produced in the State of Rio Grande do Sul. The bulk of production goes for feed uses with an estimated 1 calorie per capita of daily food consumption. About 10,000 to 15,000 tons of oats are imported annually, largely from Argentina, with occasional imports from Chile.

Rye:

Rye production generally averages less than 20,000 tons per year and imports are negligible. Nearly two-thirds of domestic supply is used for food, with daily consumption averaging only 1 calorie per capita.

Tree Nuts:

Brazil nuts, coconuts, and cashew nuts made up the bulk of tree nut production in Brazil. Brazil nuts grow uncultivated in the Amazon Basin. The amount gathered in any year depends on the price. Large quantities are available in more remote areas when prices warrant it. The greater part of domestic output is exported, with some Brazilian exports coming in from other countries bordering on the Amazon Basin. Reported exports of Brazil nuts averaged 27,011 tons in 1960-64 valued at $11.8 million, 7 percent more than the 25,194 tons at $8.9 million exported 10 years earlier.

Coconut production, on the other hand, is nearly all for domestic consumption and is mostly consumed fresh in the milk stage. Consumption averaged 4.7 kilograms per year, or 21 calories per day in 1959-61. Cultivation of coconuts in the coastal strip of Bahia and the northeast is important, but Brazil is unlikely to compete with the South Pacific in production of coconuts for copra for oil production.

Cashew nuts also grow wild or in limited plantings on small farms. All the reported production is from Bahia and the Northeast States. Ceara and Pernambuco, account for about 80 percent of reported production which averaged an estimated 10,000 tons in 1960-63. Exports averaged 838 tons, valued at $644,000, in 1960-64.

Nonfood Commodities

Nonfood commodities account for about 25 percent of the value of Brazilian agricultural output and about 90 percent of the value of agricultural exports. Principal commodities in this group include coffee, cotton, cocoa beans, and tobacco. Other commodities are castorbeans, carnauba wax, barley and malt, hops, other fibers, hides and skins, rubber, animal feeds, mate, and essential oils.

Of the principal nonfood commodities, coffee and cocoa beans are produced mainly for export, and cotton and tobacco for domestic use and exports.

Castorbeans and carnauba wax, discussed earlier with other fats and oils, are largely export commodities. With the exception of essential oils, the other nonfood commodities are mostly for domestic use, although exports of some are noteworthy.

COFFEE

Production:

Brazil, long the world's leading coffee producer, exported 36 percent of world coffee trade in 1960-64. Coffee has been Brazil's leading agricultural product for most of this century, accounting for about 15 percent of both the value of agricultural production and land in cultivation in recent years.

More than three-fourths of Brazil's coffee is produced in two States: Parana and Sao Paulo. Parana alone averaged better than half of Brazil's 1961-64 production. Minas Gerais and Espirito Santo are the next largest producing States with about 18 percent of total output. All States except Rio Grande do Sul produce some coffee, although production in the North is quite limited.

About one-sixth of all farms reported growing some coffee in the 1950 census, but large coffee fazendas (plantations) produced most of the total. Often, coffee land is leased out to small farmers who clear the land and plant coffee in return for the right to grow crops between the coffee rows until the coffee trees reach bearing age, at which time the land is returned to the owner. Coffee seed or plants are supplied to the small farmers by the plantation. Once planted, coffee receives little care--some pruning, hand hoeing about three times a year, and such fertilizing and mulching as the grower can afford.

In recent years, higher yielding varieties that come into production earlier and are planted at closer intervals have permitted much higher coffee yields. Fertilizing, terracing, and conservation practices are becoming more common, and trees can be maintained at high levels of production over longer periods of time, thus reducing production costs.

Coffee production is labor intensive, offering little prospect for mechanization in the immediate future. Coffee is usually planted on slopes and hillsides not conducive to mechanization. Activities during the growing season, which could be mechanized, serve to employ the large crews necessary for harvest. Harvesting of coffee cherries begins in April and May and lasts until July or later, depending on the labor supply and size of crop. Most Brazilian coffee is harvested by stripping trees when the cherries are at varying stages of ripeness, although high-quality, mild coffees are picked ripe.

After picking, coffee is usually cleaned of dirt, twigs, and leaves and sorted by "wet rinse" method. This method, using a water flotation process, sorts cherries into various stages of ripeness for separate drying treatment. Cherries are sun dried on specially paved drying floors for 3 to 4 weeks. After drying, coffee beans are milled to remove the husk and endocarp and are then graded for size. Cleaning, drying, and milling usually are done on the fazenda.

Although coffee has been subject to frequent overproduction and surplus stocks, the Brazilian Government has not attempted to apply acreage and production controls. In June 1962, a diversification program was initiated which had little success until recently, to improve production efficiency by subsidizing the removal of unprofitable plantings and to encourage alternate enterprises through the Grupo Executivo de Racionalizacao da Cafeicultura (GERCA). This program supplements the Instituto Brazileiro do Cafe's (IBC) storage and marketing program which strictly controlled both domestic and foreign sales.

The Government's support price for exportable grades of coffee is revised periodically, taking into account domestic inflationary pressures, world prices, and marketing conditions. For the 1965/66 marketing year, the support price was equivalent to about $19 per bag of 60 kilos and was similar to prices for recent years. A lower support price is set for nonexportable grades of coffee. Prices have been sufficient to maintain a high level of output and to keep coffee competitive with other crops produced in the same area. Warehouse receipts and bills of lading are required as collateral for crop loans. The Banco do Brasil provides credit for coffee harvest at levels established in conjunction with the Coffee Institute, usually at 80 percent of market value.

Coffee production at 1.6 million tons in 1960-64 was one-third higher than the 1.1 million tons in 1950-54 (table 50). The cultivated area in coffee increased 50 percent over the same period. Yields showed no particular trend, rising somewhat in 1955-59 but averaging less in 1960-64 than they had in 1950-54. Sharp fluctuations in year-to-year output plus rapid shifts of acreage into new areas hide the true trend of yields. Also, a significant but varying proportion of plantings in an area reported under cultivation is not of bearing age, so that reported area is seldom a true indicator of the amount of coffee harvested annually.

Demand tends to accentuate the strong production cycles of coffee. High prices, resulting from a short crop, have encouraged increased plantings. Because of the lag between planting and maturity, increased supplies eventually reach the market ahead of market demand and cause severe price slumps. Gradually increasing world demand and declining Brazilian production may eventually result in a near equilibrium, unless the whole cycle is upset by another short crop due to weather or other natural causes.

With few interruptions, notably during the 1930's, production has always trended upward. Overexpansion during the 1920's and 1930's and the subsequent abandonment of about one-third of the area in production was followed by a slow uptrend until 1955. At that time, both area and production began to climb more rapidly and finally surpassed the pre-World War II levels in 1955-59. Production continued at high levels in 1960-64, despite Government efforts to reduce area and production.

The gradual westward movement of coffee production through Sao Paulo and southward into Parana reached additional and high-yielding virgin lands and hastened the decline in profitability and the abandonment of plantations in the older areas of Rio de Janeiro. Parana, the leading coffee State since 1959, provided nearly 60 percent of 1962 output.

In the late 1950's, the coffee frontier reached the edge of the temperate zone in Parana. Freezing weather in the winter of 1963, following a severe drought, seriously damaged or killed a large number of young trees, causing a drastic drop in the 1964 coffee harvest. Recovery in 1965 was particularly good, but the effect of the freeze may have been to more sharply define the southern limit of coffee production. Year-to-year crop fluctuations also may be accentuated since the major production now occurs in areas affected by periodic frosts, which still compete profitably with the frostfree area.

In 1966, Brazil reassessed the diversification program and coffee economy in the light of world market prospects and set a realistic annual production goal of 24 million bags (1,440,000 metric tons), allowing 17 million (1,020,000 metric tons) for the ICA export quota and 7 million (420,000 metric tons) for domestic consumption. Bounty payments are made for the elimination of coffee trees to provide room for diversified crops. The payments are increased progressively with the number of trees removed up to a limit of $170 for a hectare of 750 trees. The eligible substitute crops are: Annual crops of corn, rice, beans, castorbeans, sunflowers, soybeans, peanuts, cotton, manioc, wheat, forage crops, and tobacco; and perennial crops of citrus, avocado, mango, pecan, banana, ramie, phormium, tung nuts, and peppermint. For these substitute crops, no subsidies are paid under this program. The previous diversification program under GERCA did not succeed because coffee support prices exceeded bounty payments for tree removal. The Government held the support price for coffee at the 1965 level, and since inflation of 41 percent occurred, this lowered the real income of coffee growers. Also, sharply reduced output in 1966 helped encouraged coffee growers to diversify, so that 400 million trees were eradicated in the period October-December 1966. Continued success of this program could bring production in line with demand, although strong pressures continue for reversion to the old system of uncontrolled production at favorable producer prices.

Demand:

Domestic demand took an estimated 422,000 tons in 1960-64--about one-fourth of Brazil's production. Usually lower-grade coffees that are not in particular demand on world markets are reserved for domestic use. Coffee prices have been purposely kept low to Brazilian consumers and consumption at 5.6 kilograms per capita in 1960-64 was probably higher than in most other countries with comparable incomes per person.

When Brazil could not sell all of its output on the world market at prevailing prices, after domestic needs were met, a policy of restricting exports and maintaining surplus stocks was followed in an attempt to manage world prices.

World consumption does not greatly change with normal fluctuations of price. A short supply situation can quickly drive the prices up before a significant reduction in consumption occurs. Abnormally high coffee prices in 1958, however, resulted in considerable substitution of other beverages for coffee, a market which coffee did not fully recapture when the price fell again.

Within certain income ranges, coffee consumption increases significantly as income increases. This, together with expanding population, has resulted in the world market increasing about 4 percent annually in recent years. Producing countries estimate that, along with recent increases in per capita income in western Europe, a reduction of tariffs or taxes on coffee would significantly increase consumption. In addition, bilateral trade agreements with eastern European countries are increasing the low level of coffee consumption in that region. Per capita consumption in the United States, which consumes nearly half of world trade in coffee has declined slightly. In addition, Brazil has not maintained its earlier share of the U.S. market.

To compensate for the production and price cycle, Brazilian planners resorted to some type of supply management over most of this century. More or less successful efforts to maintain world prices encouraged production elsewhere, particularly in Africa. This, in turn, helped to reduce the price effects of the fluctuations in the Brazilian crop. Between the 1957 and the 1963 crops, Brazil's total production exceeded exports and domestic use by about 3.0 million tons, or 2 years' supply. In spite of this surplus, Brazil's share of the world coffee trade declined from 51 percent in 1947-53 to 37 percent in 1960-64. If Brazil had maintained its earlier share of the world market, this surplus could have been reduced by 1.8 million tons. While 1964 exports were larger than production, the high 1965 crop marked a return to surplus production with stocks near peak levels.

Brazil's efforts at supply management are entwined with foreign exchange controls, balance of payment difficulties, and budgetary matters. The IBC, organized in 1952 as a semiautonomous institute, works with the Ministry of Finance and the Bank of Brazil to regulate and supervise prices, shipments, and the quality of coffee exports. It succeeded various State and Federal coffee control agencies established as long ago as 1901.

Before setting coffee marketing regulations, the IBC makes crop surveys in January, March, and June to determine the size of the developing crop. Marketing regulations are based on stocks, export demand, and estimates of the size and quality of the crop. Regulations require the registration of all coffee intended for export and govern the movement of coffee from interior points to the ports. The IBC sets a grower support price at interior points. The producer may sell to IBC, sell to an exporter, hold his coffee over to the next crop, or, depending on the size of the national crop, he may be required to sell a proportion of his crop to IBC.

Quarterly export quotas for all of Brazil and fortnightly quotas for each export port are set by IBC. Quotas may be shipped by private traders or from IBC stocks. The IBC program establishes, and revises whenever necessary, minimum export prices for every type of coffee for each port of shipment in accordance with world market prices and the world supply situation.

The Bank of Brazil regulation of export prices and foreign exchange has varied considerably in recent years. For many years, coffee exchange was converted at a fixed rate well below other export and import rates. Although certain bonuses were paid to compensate for changing world prices and inflation, the rate exporters received averaged 50 percent or less of the free market value. After July 1961, coffee exchange was sold at the "free" rate but a "contribution quota" of $22 per bag was withheld by the bank.

The present system of flexible contribution quotas in effect provides a fixed return of about $24 to the exporter and currently provides about $31 per bag to IBC's Coffee Defense Fund. IBC also assesses and collects various charges for inspection, port charges, and 25 cents per bag for contribution to the Pan American Coffee Bureau.

Domestic coffee utilization is expected to remain at about the 1960-64 rate of 5.6 kilograms per capita. At this rate, demand will increase at about 3 percent per year, the rate of population growth.

Trade:

Coffee has supplied 50 percent or more of the value of Brazil's exports for a number of years. As the world's leading coffee exporter, Brazil currently supplies 30 to 40 percent of the world coffee trade in green coffee beans. Exports of instant coffee or coffee extract have lagged behind world consumption of this product, and, in 1963, Brazil's exports of instant coffee were equivalent to only 82 tons of green coffee while U.S. consumption of instant coffee was equivalent to 22 percent of total coffee consumption. However, exports of soluble coffee became appreciable in 1965, when exports to the United States totaled 125 metric tons. They expanded enormously in 1966 with exports to the U.S. of 2,421 metric tons by November 30. The industry achieved economies by the use of grinders (broken beans) as raw material. Brazil's coffee exports fill a range between the so-called Colombian "mild" coffee and the African "robustas". Brazil's coffee generally is used in blends with other world coffees--the proportions depending somewhat on prices and relative availabilities of competing types and partly on quality factors.

About half of Brazil's coffee was exported to the United States in 1960-64. Most of the remainder went to western Europe; Sweden, the largest market, took more than 50,000 tons or about 5 percent of the total.

Total exports increased much less than production, averaging slightly more than 1 million tons in 1960-64--15 percent higher than in 1950-54 (and only 12 percent higher than in the 5 years 1935-39). Over the same period, world coffee trade increased 40 percent.

Due to its policy of restricting exports and in spite of quality advantages, Brazil lost ground to African producers who were willing to export coffee at lower prices.

Future trends in Brazilian and world trade are bound up within the 1963 International Coffee Agreement (ICA) between producing and consuming nations. This agreement developed out of previous agreements which were designed to reduce fluctuations in world coffee prices. The Pan American Coffee Bureau was formed in 1936 to help regulate supplies. The 1940 Interamerican Coffee Agreement assured Latin American coffee producing countries a share in the U.S. market; in 1948, this agreement broke down due to high prices. World production and disappearance were more or less in balance until the 1955-56 crop surplus again focused attention on controls.

The 1957 Mexican Agreement led to the International Coffee Agreement in September 1959, supported by producers of 95 percent of the world's coffee and extended annually. In 1963, a joint producer-consumer agreement was signed by 30 countries having 93 percent of exports and 16 countries having 86 percent of imports. The new agreement establishes annual export quotas and gives the consuming countries responsibility for enforcement. Quotas are based on expected world demand during the October-September marketing year. A price clause permits an increase or decrease in quotas if world prices exceed or fall below set levels over an established period of time. Prior to acceptance of the price clause, Brazil supported world prices by limiting exports to about two-thirds of its quota of 18 million bags in the 1964/65 shipping season. The International Coffee Agreement of 1962 has been a means of stabilizing the world coffee market during the succeeding years in which it has been in force. The agreement made substantial progress toward maintaining world coffee prices at profitable levels for producing countries. Increasing per capita income and population promise a continuation of current rates of expansion of world coffee consumption, but are far from absorbing the current surplus production in Brazil or other producing countries. Exports and export earnings, however, will continue to grow, providing the ICA controls are effective.

Assuming that Brazil will share in world coffee market increases at roughly 2.5 percent annually, trade will not increase rapidly enough to materially assist in reducing surplus output.

COTTON

Domestic demand plus profitable exports continued to keep cotton high among Brazil's commercial crops in value of production. From 1961 to 1965 cotton ranked second among Brazilian exports. Strong domestic demand for cottonseed oil, discussed earlier, also favored cotton production.

Production:

Cotton covered 3.6 million hectares in 1963 or more than a tenth of Brazil's cultivated area according to Brazilian estimates (table 51). Brazil has two distinct cotton areas: The southern upland cotton area provides about two-thirds of Brazil's total production, and the Northeast provides about one-third.

In the Northeast, the most important producing States are Ceara, Paraiba, Rio Grande do Norte, and Pernambuco. Annual upland cotton is raised in the belt of plentiful rainfall inland from the high-rainfall coastal sugar belt. The perennial long-staple "moco" cotton is raised in the drier interior where cotton "trees" typically grow to about 7 years of age. More than half of the Northeast production is long and medium staple.

In the southern area, production centers on Sao Paulo and northern Parana. But large areas of Minas Gerais, Goias, and Matto Grosso are also suitable for cotton and production is moving in that direction. All the southern production is upland cotton. Rainfall is adequate though not always well distributed, sometimes interfering with harvest.

The typical cotton grower in southern Brazil is a tenant who cleared land for multiple use as in the case of coffee. More recently, cotton became established in frontier areas outside the traditional coffee culture area and in permanent cropping rotations in established areas. An estimated 85 percent of the crop, however, is produced by small operators, using a mule and family labor on about 15 acres. Under this system, uniformity of quality is aided by a Government monopoly of cottonseed distribution in Sao Paulo and Parana.

The typical Northeast grower is a subsistence farmer who interplants cotton with food crops on his small acreage, but some cotton also is grown on large commercial plantations. Because of its resistance to drought, "tree" cotton is one of the best and most dependable cash crops in regions of scant rainfall in the Northeast, and cotton encounters very little competition from other commercial crops.

In southern Brazil, annual cotton competes with food crops and commercial production of castorbeans and peanuts. Depending on prices, cotton competes with coffee for new land and follows coffee on the better lands. However, sugar is usually more profitable than cotton where milling facilities are close at hand.

Brazil's cotton production showed a substantial increase between 1950-54 and 1960-64 (table 51). USDA estimates, based largely on trade sources, showed a 33-percent growth while Brazilian estimates showed a 47-percent increase. Both area and yield increased in this period--area by 18 to 27 percent (depending on which production series is used) and yields by 13 to 15 percent.

Both production zones showed major production increases, with greatest growth in the Northeast, which increased its share of the total from about 31 percent in 1950-54 to 41 percent in 1960-64. Increasing competition from food crops and coffee limited expansion in the southern cotton area, particularly in Parana. Between 1950-54 and 1960-64, production in northern Brazil more than doubled on a 66 percent increase in area, while in southern Brazil, production increased 37 percent on a 14 percent decline in area (based on Brazilian data).

Harvested area in the Northeast increased steadily from 0.7 million hectares in 1940-44 to about 2.4 million in 1960-64. Harvested area in the southern region reached a peak of about 1.7 million hectares in 1940-44, declined to 1.0 million in 1955-59, and increased to 1.1 million in 1960-64.

Sharply rising domestic demand for food, coupled with declining world cotton prices, reduced the incentive for increasing cotton production in Sao Paulo. At the same time, reduced competition from the more populous coast gave impetus toward production in the frontier areas where transportation costs and marketing problems favor cotton over more perishable commodities.

Competition between cotton and coffee for labor at peak harvest periods in Sao Paulo encouraged the planting of peanuts or castorbeans where labor supplies tended to be short. The competition between annual crops depended to a considerable degree on price relationships, particularly on levels of support prices. Because of Government participation in the pricing of agricultural commodities, it is difficult to foresee the development of price trends favoring any particular crop.

Brazil has plentiful land for the expansion of cotton output, but increased emphasis on food crop production and lower price supports are expected to reduce the rapid rate of increase of the last 10 years. Production is expected to expand, however, at least as fast as domestic consumption and may expand more rapidly with favorable Government price policies.

Demand:

Cotton supplies 80 percent of the fiber needs of the domestic textile industry, which produces essentially all textiles used in the country. Consumption of artificial and synthetic fibers, while increasing, took some of the market for wool but apparently had less effect on cotton's share of the market. However, growing industrialization and the adoption of new synthetic processes will likely produce greater inroads in the future. Import restrictions practically prohibited imports of cotton fiber, textiles, and piece goods while Brazilian exports of these commodities become significant. Inasmuch as Brazil produces various staple lengths of cotton, there is no need to import raw cotton. Foreign markets took 20 to 40 percent of raw cotton production.

According to an ECLA study of the Textile Industry in Brazil, cotton from Sao Paulo and the Northeast were of fairly good quality with satisfactory fiber strength (29). However, lots were mixed, often consisting of fibers of different lengths. As a rule, cotton was not clean enough, and contained a relatively high proportion of such foreign material as seed husks, twigs, and grit. Cotton from the Northeast often contained caroa or other fibers which could not always be eliminated and caused a large number of breaks in manufacturing. Also, poor classification required mill owners to reclassify every lot arriving from their warehouses.

Brazil's cotton textile industry has existed for more than a century. Improvement of plants, equipment, management, and operations to create an efficient and modern industry must compete for investment funds with other growth industries. The textile industry employs about 20 percent of the industrial labor force and pays about 18 percent of industrial wages but is outranked by food industries in value added.

During the recession in domestic demand in 1964 and 1965 excess textiles stocks were exported, often on small margins. With resumption in domestic demand Brazil would like to retain the export market but at more profitable margins.

The domestic market is likely to continue a strong rate of growth but with considerable sensitivity to the rate of growth in per capita income. Exports of milled yarns and textiles are not likely to compete with exports of raw cotton under conditions of high domestic demand and the overall lower efficiency of cotton manufacturing in Brazil compared with more modern plants in other countries, especially in Japan and Hong Kong.

Based on mill output, FAO estimated per capita cotton textile consumption in Brazil at 3.6 kilograms in 1955-59 (29). Cotton production minus exports indicated that available supplies per person of lint cotton for the same period averaged 3.7 kilograms, using USDA production data, and 4.9 kilograms, using Brazilian production data. Converted at the rate of 88 percent of textile output per kilogram of lint cotton, the FAO consumption lies about midway between the equivalent availabilities of 3.2 kilograms for USDA and 4.3 kilograms for Brazilian estimates. This suggests that actual cotton production in Brazil may lie somewhere between the two series of production estimates.

The FAO estimated the income elasticity of demand for cotton textiles at 0.65. At the 1.6 percent annual increase in personal income expected in the 1960's and population increases of 3.0 percent, an annual growth rate in total cotton consumption of over 4 percent is indicated. However, in 1950-54 to 1960-64, availability--production minus exports--increased by only 1.6 percent per year, according to Brazilian statistics, and decreased, using USDA estimates.

Trade:

Cotton fiber was one of the earliest exports from colonial Brazil, and is still a major export crop. Exports of cotton fiber amounted to $46 to $114 million annually in 1960-64, accounting for an average of 7 percent of Brazil's total exports in this period. Half or more of Brazil's cotton exports moved to western Europe, mainly West Germany. Japan and Hong Kong were also major markets and took 13 percent and 9 percent, respectively, of 1960-64 exports.

Brazil has a U.S. quota for the sale of 618,723 pounds of upland cotton. However, Brazil's exports of cotton fiber to the United States averaged less than 1 percent of its exports to all markets.

Cotton exports, according to USDA estimates, declined from 150,000 tons annually in 1950-54 to 91,000 tons in 1955-59, and increased again to 207,000 tons in 1960-64. However, a closer examination of export trends revealed sharper fluctuations. Brazil's exports of cotton textiles also showed a sharp upturn from $0.6 million in 1956-58 to $2.4 million in 1961-63.

The Government sets export quotas for raw cotton, based on preharvest estimates of production and domestic milling needs. Separate quotas are set for the northern and the southern cotton area. Initial quotas released shortly before harvest generally are conservative and may be increased when market supplies become more certain. Within these quotas, exports are licensed to individual firms on the basis of their past exports. A residual is maintained for new firms. The Government also sets floor prices for exports for each grade and quality in the two production zones.

Brazil's ability to compete in world markets has been somewhat obscured by price controls, export taxes, and variable exchange rates in the past. At the single exchange rate prevailing in 1964 and 1965, cotton production for export was profitable. In order to maintain export earnings, the Government is expected to try to keep cotton prices competitive with other crops and, at the same time, competitive on world markets. However, exchange rates advanced less than production costs in 1965, and domestic prices began to favor food crop production.

Brazil would like to expand sales of finished cotton in the United States. In 1964, Brazil's share of the U.S. textile market was less than 6 million pounds. This increased to 10 million pounds for the year ending in September 1966. Only Japan, Hong Kong, and Mexico were shipping more.

Brazil is expected to continue to compete on world cotton markets at current prices. Export surpluses probably will increase much more slowly than in the past 5 or 6 years due to increasing competition from other crops, but may attain levels reached before World War II.

COCOA BEANS

Production:

Long second to Ghana in world production of cocoa beans, Brazil is now in third place, behind Nigeria. The rapid rise in production in West Africa reduced Brazil's importance in world cocoa bean output, although Brazil still produces about as much as the remainder of the Western Hemisphere. Cocoa beans are the second most important tree crop; they are next to coffee in area and in value of production. The cultivated area, however, amounts to less than half a million hectares, or about 11 percent of the area devoted to coffee.

The State of Bahia produces about 95 percent of Brazil's cocoa beans and neighboring Espirito Santo most of the rest. Cocoa beans are produced mainly on fairly large plantations although there are many small growers. Brazil has two cocoa harvests. The main crop runs from October through April and the second crop, which may be larger than the first, begins in May. The Brazilian crop year runs from May through April, while the world cocoa year extends from October through September. For this reason, Brazil's cocoa statistics differ from world total statistics.

According to Brazilian estimates, production trended upward in earlier years, increasing from 130,000 tons in 1935-39 to 165,000 tons in 1955-59 (table 52). The trend since 1959 was generally downward. The area showed similar trends, but productivity in general declined due to soil exhaustion and the advanced age of most of the cocoa trees;

disease reduced output in some years. USDA estimates of production followed similar trends with somewhat lower levels of output.

Cocoa beans compete with few other crops outside the limited area of Brazil where they are grown and few crops compete with them in that area. There is still considerable land in Bahia that could grow cocoa beans. As an alternative to further expansion of cocoa bean plantings, Bahian growers are looking to plantation rubber which currently has high subsidized Brazilian prices.

In 1957, an executive commission (CEPLAC) was created to establish a program for recuperation of cocoa bean production, trade, and industry. CEPLAC has provided loans and extension activities for growers, established a research center, and operated the price support program. The price support program was of little importance until 1965 when it began to make compensatory payment for the difference between the support price of 9 cents to the lowest level since 1946. However, world production fell 18 percent the following season, to 1,227,000 metric tons. Prices recovered in 1966 almost as sharply as they had fallen the previous year, averaging 24.4 cents a pound, basis New York Spot for "Accra." Production for 1966/67 is now forecast at 100,000 metric tons above the 1965/66 crop, a level still short of world consumption requirements.

Average export prices fluctuated widely from a high of over $50 per 100 pounds of cocoa beans in 1954 to less than $20 per 100 pounds in 1965. Brazil's exports are mostly beans with 20 to 25 percent of the total export value represented by sales of cocoa butter, cake, and powder. Surplus stocks that could not be readily taken on world markets were processed into cocoa powder or cake and butter to prevent deterioration and to wait for better markets.

World demand outpaced production in 1966 and early 1967, resulting in good prices for producing countries. With this development and Brazil's domestic consumption requirement approximating 15,000 metric tons per year, demand and prices will likely remain favorable in 1967.

Trade:

Cocoa beans and cocoa products are fourth in importance among Brazil's export crops and Brazil ranks third in world cocoa trade. Exports of cocoa beans and cocoa products earned an average of $60.1 million in 1960-64, down from $98.2 million in 1955-59 (table 10). In 1965, 74 percent of cocoa bean export went to the United States, 18 percent to other Latin American countries, and the remainder largely to Western Europe. The United States also took most of Brazil's exports of cocoa powder and 16 percent of the cocoa butter. The value of bean and product exports to all countries totaled $41.4 million in 1965.

In 1964 cocoa exporters, plagued by rapid increases in production with the consequent decline in prices, combined to form the World Cocoa Producers Alliance. Five West African producers and Brazil, representing about 80 percent of world output, attempted to maintain export prices through export quotas. The Alliance withdrew from selling in mid-October 1964 after prices fell below the "indicator" level of 23.75 cents per pound. A record crop and financial difficulties forced the Alliance to reenter the cocoa market, without achieving its objective, in February 1965 after a 14-week period of suspended sales. Large inventories in consuming countries had a detrimental effect on the Alliance's endeavor to control cocoa prices.

The United Nations Cocoa Negotiating Conference met in New York May 23-June 23, 1966. The participants failed to agree on the mechanics of operation of a buffer stock, minimum and maximum prices, and other related matters. Nothing of substance was accomplished at subsequent meetings in September and November.

In July 1965 Brazil's President created a new Cocoa Policy Study Commission made up of representatives of all the agencies and ministries concerned to review the domestic and international implications of current policies and establish hew guidelines. It is likely that increasing efficiency will keep Brazil in the cocoa business, but there will probably be a shift in production to other crops for a large portion of currently inefficient producers. Large increases in exports for the near future appear doubtful.

TOBACCO

Production:

Brazil ranks 5th in world production of tobacco but tobacco is about 13th in value of crop production in Brazil, with only 250,000 hectares devoted to the crop in 1963.

Although some tobacco is grown in all States, two States, Bahia and Rio Grande do Sul, produced about half of Brazil's tobacco, and together with Minas Gerais and Santa Catarina provided about 85 percent of total production.

Rio Grande do Sul, Santa Catarina and Parana supplied mostly cigarette tobacco, largely flue-cured and some air-cured. Bahia grew cigar filler, binder and wrapper, and adjacent Sergipe produced cigar filler. In these States, tobacco was generally grown on small commercial farms under contract to processors or exporters and received technical supervision and grade standardization. In Bahia, a Tobacco Institute was working to improve production handling and packing to supply a better and more uniform product. In the south, cigarette manufacturers were providing the same service for contract growers.

Minas Gerais and other States produced "twist" tobacco which was consumed on farms or sold in local markets for handrolled cigarettes, pipe smoking, and chewing. Twist tobacco supplied an estimated 25 to 30 percent of the total output; flue-cured, 30 to 50 percent; air-cured, about 10 percent; cigar tobacco 20 to 25 percent; and burley, about 1 percent.

Brazil's tobacco production increased steadily from 1950 to 1955. After a period of stagnation, it resumed growth in 1959, and reached a record level of 153,000 tons in 1960-64, according to USDA estimates (table 53). Brazilian estimates were somewhat higher--187,000 tons. USDA production estimates are based on utilization of commercial grades as shown in tax records, with an allowance for production of "twist" which is untaxed. Brazilian estimates under the county reporting system were somewhat higher. The difference was more pronounced in recent years; Brazilian sources showed a much greater gain in both area and production than those used by USDA. According to USDA estimates, production increased 25 percent between 1950-54 and 1960-64, compared with 53 percent for Brazilian estimates. Yield trends are uncertain; USDA showed a drop in yields and Brazilian sources showed an increase over the same period.

Tobacco is a preferred crop with a limited acreage, and has little competition from other crops. Growth in output is highly dependent on demand because of the contract nature of most tobacco production. Demand trends appear favorable for continued growth in production.

Demand:

The domestic market took about three-fourths of total output and the rest was exported. About two-thirds of domestic demand was for commercial grade tobacco, largely for cigarettes, but with some cigars and pipe tobacco. About one-third was twist tobacco, used for homemade cigars and cigarettes or pipe smoking. Exports were about two-thirds Bahia cigar leaf with the rest largely flue-cured or air-cured leaf from Rio Grande do Sul and with small exports of "twist" to Uruguay.

Brazil's manufactured cigarette consumption grew at an average rate of 5 to 6 percent a year--about twice the rate of population growth. Total domestic demand for tobacco probably grew at a lesser rate as handrolled gave way to factory-produced cigarettes. Data were not available on production of cigars and pipe tobacco which are a small part of total demand.

Growth of the domestic industry was aided by import and exchange restrictions which virtually excluded imports of cigarettes and cigarette tobacco. Small quantities of cigar wrapper and binder were imported. The reduction in imports of high quality tobacco and cigarettes led to an improvement in domestic tobacco and cigarettes. Improving quality led to increasing foreign demand, but domestic demand (based on income and population growth) probably will continue to provide the main incentive to increasing production.

Trade:

Brazil is Latin America's most important tobacco exporter, and tobacco ranked sixth in value among Brazil's agricultural exports in 1963 and 1964, with a fourth or more of domestic production exported in those years. Exports were largely Bahian cigar leaf but with increasing quantities of cigarette tobaccos from Rio Grande do Sul. Negligible quantities of twist and other tobacco were exported.

Brazil was a net exporter of tobacco for many years. Exports dropped during World War II, but picked up to 30,000 tons in 1950-54 and 1955-59 and 45,000 tons in 1960-64. Exports of leaf tobacco totaled nearly 60,000 tons in 1964, valued at $28.3 million. Other unmanufactured tobacco totaled less than 500 tons and was valued at $243,000. Exports of manufactured tobacco were valued at $380,000, mainly cigars and cigarillos.

Brazil's exports to the United States increased markedly in recent years. Exports to the United States in 1964 included cigar leaf tobacco valued at $3.2 million and cigars valued at $74,237. Exports to the United States amounted to less than 1 ton of leaf and $1,523 worth of cigars in 1960. At the same time, Brazilian imports, largely from the United States, declined from 17,629 kilograms of leaf worth $90,969 in 1960 to 1,652 kilograms worth $4,550 in 1964.

Brazil's exports to other principal markets in 1964 were as follows (leaf tobacco in thousand tons): Spain, 10.2; West Germany, 9.7; Netherlands, 7.7; and France, 6.9. Brazil expects to further increase its sales of leaf tobacco to the USSR, which reached 6,355 tons in 1964, compared with 2,193 tons in 1962. Cigars went mainly to the United States and to western Europe, while cigarette exports went largely to Paraguay and Bolivia.

The uptrend in tobacco exports since 1960 was due largely to increased exports of flue-cured tobacco from the southern States. Reduced sales of Bahian cigar leaf to other markets offset increased sales to the United States since 1960. Bahian tobacco dropped from 80 percent of 1960 exports to 62 percent of 1964 exports. Exports of tobacco other than from Bahia increased from 6,261 tons in 1960 to 22,711 tons in 1964. Further gains are expected.

Rapid expansion and modernization of Brazil's domestic tobacco manufacturing industry will help to keep it competitive in world markets and particularly in adjacent countries. LAFTA agreements may provide Brazil some advantage over non-LAFTA suppliers. Improving quality in Brazil's tobacco production is narrowing the quality advantage other suppliers previously had. Exports of both cigar and cigarette types are expected to continue to grow.

OTHER COMMODITIES

Brazil produces a number of other nonfood commodities or byproducts that are important in trade, either as exports or in competition with imported products. The more important of these include barley and malt, hops, fibers, hides and skins, rubber, animal feeds, mate, and essential oils.

Barley and Malt:

Barley is largely used for the production of malt for beer making but barley also supplied an estimated 2 calories per day in 1959-61, largely in soups.

Brazil's barley production is concentrated in Rio Grande do Sul. Brewers encouraged the production of barley for malt, and total production rose from 15,000 tons in 1950 to 35,000 tons in 1955. Since 1955, production averaged about 28,000 tons, or roughly a fourth of domestic consumption (table 54).

Malt imports showed little gain, averaging 75,000 tons in 1955-59 and 73,000 tons in 1960-64 (barley equivalent). Increasing domestic demand covered by larger imports of barley for conversion to malt in Brazil. Barley imports increased from 4,000 tons in 1955-59 to 28,000 tons 1960-64.

Argentina dominated both the malt and barley market in Brazil although Uruguay and Chile supplied some barley and considerable malt. The United States has not exported significant quantities of barley to Brazil and exports of malt dropped steadily from about 12,000 tons in 1951 and 1952 to less than 1,000 tons since 1960. Canada's share also declined from about 4,000 tons in 1955-59 to about 3,000 tons. The U.S. decline was largely due to domestic price considerations, which are likely to continue, rather than to market discrimination on the part of Brazil.

Hope

For production of beer, Brazil relied almost entirely on imported hops which averaged $2 million in the period 1960-64. Domestic hops production, variously estimated at 15 to 50 tons per year, was used by local breweries in Rio Grande do Sul. Domestic hops are reportedly inferior in quality and no trend has been evident to increase domestic production.

Imports trended up as follows: 1950-54, 1,019 tons; 1955-59, 1,058 tons; and 1960-64, 1,164 tons. The U.S. share of Brazil's market increased from 48 percent in 1955-59 to 78 percent in 1960-64, valued at $1.3 million in the latter period. Principal competitors are West Germany, Czechoslovakia, and Yugoslavia, but the United States is likely to continue to be the principal supplier of this growing market.

The 1965 LAFTA common list included hops as an item that can be imported duty-free from other LAFTA members. Currently, hops production in LAFTA countries is very small. The import duty of 15 percent against other countries is not likely to spark any great increase in production in Brazil, but eventually Latin American production could provide some competition. As in other world markets, the future expansion of demand for hops will be reduced by a trend towards extract of hops. Brazil imported 5 tons of hops extract from July 1964 to June 1965, compared with 100 kilos in the preceding 12 months.

Other Fibers:

Since World War II, Brazil developed from a net importer of hard and soft fibers to a net exporter of both and a major source of world sisal exports. Brazil's sisal, henequen, and caroa account for nearly 20 percent of world production of hard fibers. In addition, Brazil is fifth in world production of jute and exports a small surplus of jute and malva, ramie, and kapok. Fibers are important to Brazil's agricultural economy because they have high labor requirements and are grown in areas that have a narrow choice of economic alternatives.

Sisal and Caroa.--Production of sisal is concentrated on small dryland farms in the interior of the Northeast, chiefly in Paraiba and Bahia, but with important production in Rio Grande do Norte and Pernambuco and some protection in other States. Average yields on the commercial estates in Bahia are higher than on the small holdings of Paraiba. Sisal, a long-lived perennial, competes with cotton, castor beans, and other dryland crops. Sisal harvest can be delayed during periods of drought or low prices without deterioration. The leaves or spines can be harvested at the convenience of the grower. Fiber is prepared on farms in rough form and marketed through trading organizations (mainly exporters) which complete processing and standardization. An Executive Commission for sisal was established in 1958. In 1965, the Agricultural Production Finance Commission initiated minimum support prices for sisal at an equivalent of 5 cents per pound, graded and stored in official warehouses.

Caroa, a fiber similar to sisal, is produced from the leaves of a wild plant that grows in the dry areas of the Northeast, and may be substituted for sisal in cordage. Production of about 3,000 metric tons is only 2 percent of sisal production.

The major part of sisal production is exported--1964 exports of 136,000 tons were greater than gross domestic availability of about 93,000 tons (table 55). Exports of sisal and agave were valued at $33.9 million in 1964, outranking sugar, to place fourth among agricultural exports that year. In Brazil's transition from net importer of hard fibers to one of the most important sisal exporters, Brazilian prices declined drastically--1958 prices on a deflated basis were roughly one-fourth of 1950 prices. Some sisal has been used in Brazil for making paper to replace imported wood pulp. Major competition comes from Africa. Brazil is free of the sisal weevil that plagues some other important producing countries.

High prices in 1963 and 1964 stimulated plantings and production is expected to increase for several years, as sisal takes 4 years to mature. Sisal production is favored in the Northeast because of its ability to do well under dry conditions and also because processing provides employment for some of the surplus labor in this region.

Exports of rope and twine began in 1961 and promise continued expansion as prices remain competitive and industrial capacity is expanding.

Jute and Malva.--Production is mainly in the State of Amazonas on small units in the Amazon River lowlands. The low population density, tropical climate, and lack of amenities slow the development of this region. Jute production received major emphasis during a period of high prices in the late 1940's. Production increased rapidly until about 1953 when domestic needs were met, and has continued to grow since that time (table 56). Brazil produces small amounts of malva which can be mixed with or substituted for jute. Brazilian production is not competitively priced on world markets and further growth of this industry will probably be dependent mainly on domestic demand.

An executive group was formed in 1961 to promote the production, processing, and marketing of jute. The Government has attempted to increase production by distributing seeds of improved varieties, by establishing minimum prices, and by crop loans and production credits. Production, however, has been related to domestic demand and was cut back when the demand for bags was curtailed by short coffee and wheat crops. Credit and minimum prices set at 5 1/2 cents per pound for the 1965 crop have not had much effect in expanding production.

Export statistics for jute vary widely. Shipments apparently averaged less than 1,000 tons in 1955-59 and increased to 2,000 tons in 1960-64. However, exports may have reached 10,000 tons in 1965.

Ramie. Ramie fiber, somewhat similar to flax in its uses, is grown in Parana and Sao Paulo. The plant can continue in production for up to 10 years. The fiber is used in making thread and twine and can be mixed with linen and wool in fabrics or even woven alone. Production totaled about 10,000 metric tons annually and 1962 exports were 854 tons. While some expansion is possible, this specialty fiber has not yet developed any great increase in demand.

Wool.--Brazil's wool production, averaging only 25,000 tons in 1960-64, comes mainly from the Temperate Zone State of Rio Grande do Sul. The uniformly warm temperature of Brazil that limits production also limits demand. Nearly all wool used in the country is of local origin and Brazil occasionally exports wool. Due to import restrictions, domestic wool prices are about one-third higher than world prices for fine and average qualities. No significant changes in wool production are expected which would affect its competitive position in relation to alternative crops.

Hides and Skins:

Brazilian production of hides and skins averaged 180,000 tons in 1960-63; output was valued at about $33 million in 1963. Production trends have been up during 1950-54 through 1960-63 for each of the four main types produced; the greatest advances have been in goatskins (36 percent) and pigskins (34 percent). Cattle hide output increased 18 percent and sheepskins only 5 percent. By weight, 95 percent of production was cattle hides, 3 percent pigskins, and only 2 percent sheepskins and goatskins. There likely is some additional unreported production, particularly of sheepskins and goatskins, since 1964 exports of sheepskins and goatskins averaged about the same as reported production in the previous four years. Exports of cattle hides, on the other hand, averaged less than 10 percent of reported production; domestic uses apparently took most of the output. Exports in 1964 totaled 18,154 tons of dried and salted hides and skins valued at $7.7 million, and 684 tons of cured or tanned hides, valued at $684,000.

By weight, 74 percent of the 1964 export total was cowhides, 3 percent calfskins, 11 percent sheepskins, 18 percent goatskins, and 4 percent other. By value cowhides totaled only 35 percent; calfskins less than 2 percent; sheepskins, 32 percent; goatskins, 27 percent; and other, 4 percent.

Rubber:

Brazil probably produced an average of less than 30,000 tons of natural rubber in 1960-64. Production is largely confined to the Amazon Basin, where the main production is from wild trees, although the State of Bahia, where plantation rubber is grown, provides an increasing amount of the national production. While Brazil was once the world's major supplier of natural rubber, the country is now a net importer of this crop with average 1960-64 imports of $11.9 million, compared with exports of $3.7 million in the same period. In addition to natural rubber, Brazil produces synthetic rubber for domestic use. The price on natural rubber is held above world prices in order to stimulate domestic production. Currently, rubber production is proving more profitable than cocoa beans in Bahia, this may stimulate replacement of cocoa plantings on available lands with rubber trees.

Mate:

Brazil produced an average of 126,000 tons of yerba mate in 1960-64 and exported an average of 52,295 tons valued at $8.3 million in the same period. Production was 50 percent higher than in the preceding 5-year period, but exports were down 6 percent and the value of exports down 41 percent. The leaves were gathered largely from wild stands of the tree in Mato Grosso, Parana, and Rio Grande do Sul. Exports went largely to the neighboring countries of Argentina, Paraguay, and Uruguay to supplement local supplies of this traditional beverage crop. The National Mate Institute controls trade and prices and issues statistics on this crop.

Animal Feeds:

Production data are not given but Brazil reported exports of 186,385 tons of oil meal and cake and other animal feeds valued at $10.5 million during 1960-64. Peanut meal and cake alone accounted for 41 percent of the volume and 44.5 percent of the total value in the period; soybean meal and cake accounted for 13.6 percent of the value; babassu, cottonseed, and linseed oil meal and cake together accounted for 21.7 percent of the value; and other unspecified meal and cake accounted for 15.6 percent of the value.

Meals from milling of corn, wheat, rice, and other cereals accounted for 3.2 percent and other unspecified animal feeds for 2.0 percent of the total reported value.

Essential Oils:

Brazil reported production of 1,610 tons of essential oils in 1960-63; the most important was peppermint oil, averaging 930 tons, and the rest was largely sassafras, averaging 371 tons, and pau rose averaging 200 tons.

Production of peppermint oil increased rapidly from 155 tons in 1950-54 to 242 tons in 1955-59 and to 1,498 tons in 1962; 1963 production, however, was considerably lower at 599 tons and production appears to have leveled off.

Production of other essential oils increased much less rapidly than that of peppermint oil, which is produced from a cultivated field crop. Production of essential oils other than peppermint increased from 577 tons in 1950-54 to 687 tons in 1960-63.

Brazil's exports of peppermint oil increased from 230 tons in 1955-59, valued at $0.8 million, to 817 tons in 1960-64, valued at $2.0 million. In addition, Brazil exported 297 tons of menthol derived from peppermint oil, valued at $3.1 million, and 852 tons, valued at $6.8 million, in the same two periods.

Exports of other essential oils averaged 778 tons and were valued at $1.1 million in 1960-64.

U.S. AGRICULTURAL TRADE WITH BRAZIL

Total U.S. trade (exports and imports) with Brazil has generally averaged $1 billion or more per year since 1950. The value of U.S. imports exceeded the value of exports to Brazil in all years (table 57).

The value of U.S. imports from Brazil declined from $775 million in 1950-54 to $554 million in 1960-64, or 29 percent. Over the same period, the average value of exports to Brazil fell from $470 million to $419 million or 11 percent.

U.S. imports from Brazil were largely agricultural, just as Brazil's total exports have been mainly agricultural. The percentage varied according to the fluctuation in agricultural prices, but averaged 87 percent agricultural in 1960-64, compared with 91 percent in 1955-59 and 95 percent in 1950-54.

Agricultural products accounted for a much smaller portion of U.S. exports to Brazil, averaging less than 10 percent in 1955-59 but reaching nearly one-fourth of the total for 1960-64, when Food for Peace shipments were greatly expanded. The total value of U.S. agricultural exports to Brazil averaged $100 million in 1960-64--86 percent of it under the Food for Peace Program (table 58).

The amount and composition of agricultural trade between the two countries were strongly influenced by Government policy on both sides, and probably were far different from what would prevail under normal supply and demand factors.

The availability in the United States of surplus stocks of wheat, feedgrains, fats and oils, and dairy products complemented Brazil's shortages of these products. Brazil's imports of these products would not have been as large nor would they necessarily have come from the United States without concessional sales agreements and donations under the P.L.-480 agreement.

Brazil has slackened its campaign for self-sufficiency in wheat production, which aimed to save the foreign exchange used for wheat purchases. Present Brazilian policy aims to increase nontraditional agricultural exports in order to earn foreign exchange for imports of wheat and other commodities.

Foreign exchange and other controls limit Brazil's imports of tobacco, as well as fruits and vegetables and processed agricultural products. On the other hand, U.S. quotas limit imports of Brazilian cotton, sugar, and tobacco into this country.

From the inception of the P.L.-480 program in 1954 through 1964, 90 percent of U.S. wheat exports to Brazil were under this program, as were 68 percent of the shipments of coarse grains and products. All U.S. shipments of fats, oils, dairy products, rice, beans, and peas were under P.L.-480 or related programs. In addition, the U.S. Government provided export subsidies through payment-in-kind arrangements on a part of the commercial shipments. The availability of U.S. surpluses as well as the regulations applicable to exports under the Food for Peace Program will probably continue to affect the amount of these products going to Brazil in the next few years.

Brazil's exports of corn and rice may influence the readiness of the United States to sell wheat to Brazil under concessional terms. The United States also is now emphasizing Title IV credit sales rather than Title I sales for Brazilian cruzeiros. The 1966 U.S. Food for Peace legislation may result in further changes.

Imports

Coffee constituted the largest part of U.S. agricultural imports from Brazil (table 59). In both value and volume, it accounts for more than half of the total, averaging over one-half million tons in 1960-64 and valued at $374 million.

The relative importance of other items varies from year to year, depending on world prices and export availabilities in Brazil and other suppliers. In 1960-64, sugar was second in importance with 265,000 tons valued at $33 million. Cocoa beans and products were third at nearly $25 million. Castor oil was valued at $9.3 million, Brazil nuts at $6.7 million, carnauba wax at $6.4 million and sisal and henequen at $5.0 million. Meat and sausage casings accounted for $4.4 million, as did hides and skin. Tapioca flour, rubber, tobacco, and oiticica oil together totaled $5.1 million while other agricultural products imported averaged $7.7 million; no one product averaging over $1 million for the period.

COFFEE

Brazil's share of U.S. coffee imports averaged 38 percent in 1960-64, but declined as African and other Latin American production increased. U.S. imports from Brazil reached a low point in 1964, when Brazil stockpiled in an attempt to maintain price levels and supplied less than one-third of total U.S. coffee imports.

If the International Coffee Agreement is successful, it may stabilize Brazil's coffee shipments to the United States, even though the agreement itself does not require the United States to import specified quantities from any individual supplier.

SUGAR

In 1960-64, the United States imported 265,003 tons of sugar from Brazil--7 percent of total U.S. imports. Brazil-U.S. sugar trade has fluctuated widely, ranging from 0 to 418,202 tons.

During World War II, the United States took all the sugar Brazil could provide, but quotas were reestablished after the war. In 1955, Brazil withdrew from the International Sugar Agreement, because the country believed its quota was inadequate. Brazil was thereby excluded from the U.S. market. Following the embargo on trade with Cuba in 1960, Brazil was able to ship to the United States, even though initially Brazil had no basic quota under the U.S. Sugar Act. For 1961-66, U.S. imports have averaged 329,000 tons. Brazil's final 1966 quota and prorations was 433,000 tons. Brazil can be expected to make available all the sugar that the United States is willing to take at the preferential prices offered in the U.S. Sugar Act.

COCOA BEANS AND COCOA

The United States received 14 percent of the value of its cocoa bean and cocoa products from Brazil, valued at $24.8 million in 1960-64. This compared with 23 percent valued at $43.7 million in 1955-59.

Brazilian production appears to have no particular advantage over other suppliers to the U.S. market. Brazilian cocoa declined in importance as African production increased.

LIVESTOCK PRODUCTS

United States imports of meat and casings from Brazil totaled 5,414 tons in 1960-64--insignificant in total U.S. imports in this category.

Brazil's canned beef must compete in the U.S. market against that from Argentina, Uruguay, and Paraguay, as well as against fresh beef from a number of sources. Brazil is making an effort to expand its meat exports, but this program is not expected to make an impact on U.S. imports soon.

U.S. imports of hides and skins of domestic animals totaled 2,034 tons in 1960-64, 3 percent of total imports in this category. U.S. imports are mainly skins of goat, kids, cabretta, and hair sheep which the United States does not produce in self-sufficient quantities. Brazilian production is increasing slowly.

COTTON

Trade in raw cotton between the two countries has been small, with no exports of U.S. cotton to Brazil and with a Brazilian quota in the U.S. market of about 1,300 bales. In addition, Brazil can share in the U.S. global quota for long staple cotton. U.S. imports of Brazilian cotton have averaged 1,000 bales, about 1 percent of U.S. cotton imports, and less than 1 percent of Brazil's cotton exports.

TOBACCO

Brazil's imports of U.S. tobacco and tobacco products declined to a very low level, while U.S. imports of Brazilian tobacco continued to gain from an insignificant level in 1960 to 2,109 tons valued at $3.1 million in 1964. Brazilian trade regulations are likely to continue to exclude U.S. tobacco, while U.S. regulations will probably permit Brazilian cigar tobaccos to compete with U.S. production. At present there is no reported trade in cigarette tobaccos or cigarettes between the two countries.

FATS, OILS, AND WAXES

The United States imports a number of industrial oils and waxes from Brazil; such oils and waxes supplement U.S. production. Brazil's imports are mainly food oils from the United States to supplement domestic supplies in years of short crops, mostly under the Food for Peace Program.

The United States is the world's leading importer of castor beans and oil. It received 76 percent of the value of its 1960-64 imports from Brazil. All carnauba wax and oiticica oil imports into the United States came from Brazil.

U.S. imports of castor oil should continue to increase, as Brazil's potential for producing this crop is much larger than current production and continued expansion in U.S. consumption is expected. Output and trade in carnauba wax and oiticica oil has been fairly stable; no increase is likely as long as other waxes and oils are available at competitive prices.

OTHER PRODUCTS

U.S. imports of Brazil's sisal have been fairly stable since 1961, averaging 25,000 tons in 1960-64, down considerably from 59,744 tons in 1955-59. Higher prices during this period appear to have held down imports. Increasing competition from synthetic fibers and other packaging materials may limit the growth of this commodity in U.S. markets.

U.S. imports of Brazil nuts fluctuated from 6,432 tons in 1963 to 14,677 tons in 1961. Brazilian supplies depend largely upon price, which depends on supplies of competing nuts on world markets. No significant trend is apparent in this commodity.

It appears that domestic and international trade regulations will limit the growth of U.S. agricultural imports from Brazil and that Brazil may continue to meet increasing competition in the U.S. market from other suppliers.

Exports

Wheat and flour have constituted the bulk of U.S. agricultural exports to Brazil since World War II. Wheat and flour exports in 1960-64 totaled $84.2 million and accounted for 84 percent of the agricultural exports, valued at $100 million (table 60). Practically all of this was wheat, with flour amounting to less than 1 percent of the total.

Dairy products valued at $6.2 million in 1960-64 and hops valued at $1.3 million constituted most of the remainder with no other category averaging more than $1 million. Dairy products were largely nonfat dry milk, with significant quantities of other milk products and cheese imported in certain years.

Other commodities valued at more than $1 million in some years were cottonseed oil, soybean oil, lard, dry peas, dry beans, rice, and cornmeal. Many of these were supplied under the Food for Peace Program when temporary shortages existed in Brazil.

CEREALS AND CEREAL PRODUCTS

U.S. exports of cereals and cereal products to Brazil have been almost entirely wheat. Wheat flour, cornmeal, and other cereals averaged less than 2 percent of the total. Increasing quantities of flour and cornmeal were shipped to Brazil in recent years. In certain years, corn and rice shipments were also large, although Brazil is usually self-sufficient in those commodities and often has export surpluses.

Wheat:

U.S. shipments of wheat and flour to Brazil totaled 1.3 million tons in 1960-64--7 percent of total U.S. exports. The United States replaced Argentina as the principal source of wheat for Brazil. With continued growth in wheat consumption, it is likely that the United States will continue to supply large amounts of wheat to Brazil.

In 1960-64, 74 percent of the 1.3 million tons of U.S. wheat shipments to Brazil were under Title I (sales for cruzeiros), 14 percent were under Title III (barter for strategic materials), and only 12 percent were cash sales or charitable donations. During the previous 4 years, U.S. sales averaged 409,000 tons--83 percent under Title I; 2 percent, Title III, and 15 percent and cash sales.

U.S. wheat exports to Brazil dropped sharply in 1965. High carryover stocks, contract purchases from Argentina, and reduced domestic consumption resulted in total wheat imports of only 1.6 million metric tons, largely from Argentina. New P.L. 480 agreements and increased cash sales resulted in sharply increased shipments in 1966.

Corn:

U.S. shipments of corn to Brazil have been mainly in the form of cornmeal under relief and charity provisions of the Food for Peace Program. Cornmeal exports to Brazil averaged 7,502 tons for 1960-64, rising from 1,070 tons in 1960 to 14,199 tons in 1964. Some corn was also shipped under this program for livestock feed. This level will probably decline, because of Brazil's position as an exporter.

Rice:

The United States imports no Brazilian rice, but has occasionally shipped rice to make up domestic crop shortages in Brazil. There appears little likelihood of further trade in rice between the two countries except under similar circumstances.

Other grains:

U.S. exports of barley malt to Brazil averaged 1,879 tons in 1955-59, but they dropped to 304 tons in 1960-64. In 1964 and 1965, the United States shipped no barley malt to Brazil. The U.S. decline has been due mainly to increased price competition which is likely to continue. Brazil has been importing increasing quantities of malting barley for conversion to malt within the country, and the United States has not participated significantly in this market.

Neither has the United States shared significantly in Brazil's small imports of oats and rye because Argentina is better situated to supply these needs.

FATS AND OILS

The United States has frequently exported lard to Brazil, and occasionally sizable quantities of soybean and cottonseed oil. During 1960-64, U.S. exports of edible fats and oils to Brazil averaged 5,812 tons. These were largely 1964 shipments of 15,386 tons of cottonseed oil, 8,614 tons of lard, and 4,994 tons of soybean oil. Large shipments of refined soybean oil were again made in 1965, largely as relief and charity.

Brazil anticipates expanding its production of edible oilseeds to a level sufficient to maintain an export surplus. The United States is unlikely to find a market for edible vegetable oils, except under unusual circumstances such as the short 1963/64 crop that was caused by prolonged Brazilian drought.

Brazil's imports of inedible tallow, however, increased since 1963, due to lagging domestic production of tallow and a change in Brazil's import policy. The United States did not share in Brazil's 1964 imports of 15,843 tons of tallow, and may find it difficult to compete due to the proximity of the River Plate countries to this market. Until Brazil's meat output increases considerably, however, Brazil probably will continue to import lard and animal tallow.

HOPS

The United States exported an average of 894 metric tons of hops to Brazil in 1960-64, valued at $1.3 million. This was 11 percent of the value of U.S. hops exports. Exports to Brazil were up 81 percent from the previous 5-year period, and the value was up 38 percent.

The trend toward higher beer output in Brazil is offset by more efficient hops usage and replacement of whole hops by hop extract, which has only recently begun in Brazil but is much used in other countries. The United States, however, can be expected to maintain a strong position in the Brazilian market, which took 78 percent of its imports from the United States in 1960-64.

DAIRY PRODUCTS

U.S. exports of dairy products to Brazil averaged 23,898 tons per year in 1960-64. They consisted mainly of dried milk, with some butter and cheese shipped mainly in 1963 and 1964 under concessional sales programs. Brazil took 4 percent of the value of U.S. exports of dairy products in this period. Continued exports at this rate will depend on U.S. availabilities and export programs. Brazil is not expected to become a cash market for U.S. dairy products because domestic production of milk has increased rapidly and Brazilian Government programs aimed at self-sufficiency in milk production are expected to continue.

FRUITS AND VEGETABLES AND THEIR PREPARATIONS

U.S. exports of fruits, vegetables, and their preparations to Brazil averaged 207 tons and were valued at $179,000 in 1960-64, compared with 373 tons valued at $130,000 in 1955-59. This amounted to less than 1 percent of the value of total U.S. exports in this category in the latter period. Although Brazil's market for fruits and vegetables has risen from its low point in 1958, the United States will continue to meet strong competition from Argentina.

PULSES

Brazil's imports of dry peas and beans from the United States in 1960-64 averaged 6,697 tons--more than double the 2,644 tons in 1955-59. Most of the total was accounted for by 12,639 tons of beans in 1962 and 8,671 tons of peas in 1964, although shipments were sizable in all years. Much of the total consisted of relief and charity shipments under the Food for Peace Program.

Commercial imports from the United States are likely only in the case of severe shortage within Brazil, as that country is the Hemisphere's largest producer of beans.

OTHER PRODUCTS

U.S. exports of tobacco to Brazil have dropped to a very low level (less than $5,000 in 1964) due to domestic production increases and import restrictions in Brazil. These factors are likely to continue to keep out U.S. tobacco.

U.S. sales of essential oils to Brazil increased from an average of $134,000 in 1955-59 to $264,000 in 1960-64. Increased production and exports of essential oils by Brazil will probably limit further expansion of U.S. sales in that market. However, high-quality peppermint and spearmint oils should continue to find a limited market in preference to the lower grade domestic production.

Population growth and a strengthened economy can be expected to increase Brazil's total agricultural imports. However, U.S. agricultural exports to Brazil can expect increasing competition from LAFTA countries as well as from Brazil's own domestic production. In spite of this, the United States can expect to profit by having consistent availability of export supplies to take advantage of temporary shortages that may occur in Brazil or in Brazil's traditional suppliers. Emphasis on quality and taking advantage of a number of small opportunities may compensate for eventual declines in Food for Peace shipments. Also, economic growth could result in a rapidly growing market for quality processed foods not produced locally.

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APPENDIX

Table 1.--Annual per capita gross domestic product, inflation, currency in circulation, and total money supply, Brazil, 1948-65

Year	Annual gross domestic product per capita	Inflation rate[1]	Currency in circulation	Total money supply
	Percent			
1948	8.5	3.7	6	n.a.
1949	2.5	9.3	11	18
1950	1.9	11.9	30	34
1951	2.1	14.9	13	7
1952	2.5	8.6	11	14
1953	0.2	18.6	20	19
1954	4.6	20.2	26	22
1955	3.6	16.7	17	18
1956	-1.1	25.5	17	22
1957	3.8	11.8	19	34
1958	3.5	16.3	24	21
1959	4.2	27.2	29	42
1960	3.3	25.4	33	38
1961	4.5	37.1	52	51
1962	2.2	50.8	62	63
1963	-1.3	81.6	75	64
1964	-4.9	80.0	67	86
1965[2]	+3.8	45.0	47	75
1966[2]	-1.0	41.1	14	18

[1] The deflator is the ratio of GNP in current prices to GNP in constant prices.
[2] Preliminary.

Sources: (3) and unpublished data.

Table 2.--Trade, gold and foreign exchange, and foreign investment, Brazil, 1948-65

Year	Exports	Imports	Trade balance[1]	Gold and foreign exchange reserves[2]	Registered foreign capital investments[3]	
					Total	From United States
	Million dollars					
1948	1,173	1,134	39	758	--	--
1949	1,089	1,116	-27	721	--	--
1950	1,347	1,098	249	666	--	--
1951	1,757	2,011	-254	517	--	--
1952	1,409	2,010	-601	529	--	--
1953	1,539	1,319	220	605	--	--
1954	1,562	1,630	-68	483	--	--
1955	1,423	1,306	117	491	42.0	16.1
1956	1,482	1,234	248	611	47.5	20.1
1957	1,392	1,488	-96	476	119.2	64.1
1958	1,243	1,353	-110	465	104.2	58.9
1959	1,282	1,374	-92	366	86.8	26.2
1960	1,269	1,462	-193	345	85.1	28.0
1961	1,403	1,460	-57	470	26.5	6.2
1962	1,214	1,475	-261	291	10.6	4.0
1963	1,406	1,487	-81	216	8.4	3.0
1964	1,430	1,263	167	252	10.6	0.7
1965[4]	1,595	1,096	499	505	n.a.	n.a.
1966[4]	1,741	1,496	245	410	n.a.	n.a.

[1] Exports minus imports.
[2] End of year.
[3] Registration not required prior to 1955.
[4] Preliminary.

Sources: (3), (18), and (20).

Table 3.--Gross domestic product and disposable income, index and current dollar value, Brazil, 1948-65

[1949 = 100]

Year	Gross domestic product		Disposable income	
	Total at constant prices	Per capita in current dollars[1]	Per capita constant prices	Per capita in current dollars[1]
	Index	Dollars	Index	Dollars
1948............	95	142	98	113
1949............	100	145	100	115
1950............	105	150	102	120
1951............	110	165	102	128
1952............	117	172	104	134
1953............	120	174	104	135
1954............	130	184	105	138
1955............	138	193	112	148
1956............	141	197	110	151
1957............	151	212	115	163
1958............	161	224	114	165
1959............	173	237	118	173
1960............	183	249	122	182
1961............	198	264	[2] 127	[2] 193
1962............	208	274	[2] 130	[2] 200
1963............	211	272	[2] 128	[2] 199
1964............	[2] 207	[2] 264	[2] 122	[2] 193
1965............	[2] 221	[2] 274	[2] 127	[2] 201

[1] Per capita index in constant prices applied to 1949 dollar exchange rate as published in Conjuntura Economica, September 1963 and adjusted to current U.S. dollars by the U.S. GNP implicit deflator as published by the U.S. Department of Commerce in Survey of Current Business.

[2] Estimated.

Sources: (11), derived data, and unpublished data.

Table 4.--Population, Brazil, 5-year averages 1935-64 and annual 1950-66, with projections to 1970

Period	Rural[1]		Urban[1]		Total	
	Number	Share	Number	Share	Number	Growth rate[2]
	Millions	Percent	Millions	Percent	Millions	Percent
5-Year Averages:						
1935-39..........	27.2	70.3	11.5	29.7	38.7	n.a.
1940-44..........	29.2	67.9	13.8	32.1	43.0	2.1
1945-49..........	31.6	65.4	16.7	34.6	48.3	2.4
1950-54..........	34.3	62.3	20.8	37.7	55.1	2.7
1955-59..........	37.2	58.2	26.7	41.8	63.9	3.0
1960-64..........	40.6	54.0	34.6	46.0	75.2	[3] 3.0
Years:						
1950[4]...........	33.1	63.8	18.8	36.2	51.9	n.a.
1951............	33.7	63.0	19.8	37.0	53.5	3.1
1952............	34.3	62.3	20.8	37.7	55.1	3.0
1953............	34.9	61.6	21.8	38.4	56.7	2.9
1954............	35.5	60.8	22.9	39.2	58.4	3.0
1955............	36.1	60.0	24.1	40.0	60.2	3.1
1956............	36.6	59.0	25.4	41.0	62.0	3.0
1957............	37.2	58.3	26.6	41.7	63.8	2.9
1958............	37.8	57.5	27.9	42.5	65.7	3.0
1959............	38.5	56.9	29.2	43.1	67.7	3.0
1960[4]...........	39.0	54.9	32.0	45.1	71.0	[5] 3.0
1961............	39.7	54.3	33.4	45.7	73.1	3.0
1962............	40.4	53.7	34.9	46.3	75.3	3.0
1963............	41.6	53.7	35.9	46.3	77.5	3.0
1964............	42.3	53.0	37.5	47.0	79.8	3.0
1965............	43.0	52.3	39.2	47.7	82.2	3.0
1966[6]...........	43.7	51.6	41.0	48.4	84.7	3.0
1967[6]...........	44.4	50.9	42.8	49.1	87.2	3.0
1970[7]...........	46.9	49.2	48.4	50.8	95.3	3.0

[1] Interpolated for intercensus years. Rate for 1930 decade assumed same as 1940's and 1960 decade same as 1950's. [2] Compound rate from previous period or year. Growth notes vary slightly from those used for indices in table 22, but trends are comparable. [3] Trend rate used due to unadjusted series, calculated rate is 3.3 percent. [4] Census years. [5] Trend rate used due to unadjusted series, calculated rate is 4.9 percent. [6] Preliminary. [7] Projected.

Sources: Derived from (11), (14), and official Brazilian Government reports.

Table 5.--Relationship of income to food consumption, Brazil, 1962

Average income in dollars	Per capita per day		Per capita per year						Food cost as percent of income
	Calories	Protein	Cereals and roots	Pulses	Vegetables	Sugar	Meat, eggs, milk	Fats	
	Calories	Grams	Kilograms						Percent
Less than 200..	2,100	11	170	15	35	15	57	3	60
200 - 399......	2,500	22	195	12	50	24	125	9	50
400 - 699......	2,900	42	203	5	58	32	268	18	40
700 - 1,499....	3,100	53	193	6	67	38	324	20	35
1,500 and over.	3,100	63	123	8	100	40	413	20	28

Source: (4).

Table 6.--National income, population, and per capita income, total, rural, and urban, Brazil, 1950, 1960, and 1963

Income and population	1950[1]	1960	1963[2]	Income and population	1950[1]	1960	1963[2]
	Billion cruzeiros				1,000 cruzeiros		
Income				Per capita income			
Brazil.........	1,157.4	1,901.2	2,197.7	Brazil.........	22.3	26.8	28.3
Rural..........	331.6	536.1	616.8	Rural..........	10.0	13.8	14.8
Urban..........	825.8	1,365.1	1,580.9	Urban..........	44.0	42.7	44.0
	1,000				Index[3]		
Population				Indices of per capita income			
Brazil.........	51,944	70,967	77,521	Brazil.........	100	120	127
Rural..........	33,162	38,976	41,600	Rural..........	100	138	148
Urban..........	18,782	31,991	35,900	Urban..........	100	97	100

[1] 1950 data inflated by using ratio of GNP in current prices to GNP in constant prices.
[2] 1963 data estimated from preliminary GNP estimates. [3] 1950 = 100.

Sources: (11), and derived data.

Table 7.--Calorie, protein, and fat consumption per capita per day, and USDA nutritional reference standards, Brazil and Latin America, 1956-58 and 1959-61

Average daily intake	Unit	Brazil			Latin America		
		1956-58	1959-61	Standard	1956-58	1959-61	Standard
Calories...........	calories	2,610	2,714	2,650	2,520	2,570	2,555
Protein............	grams						
Animal...........	"	19.7	20.4	10	24.0	23.2	10
Animal and pulse.	"	33.6	34.8	20	33.1	32.9	20
Other............	"	29.3	30.2	40	32.9	33.2	40
Total..........	"	62.9	65.0	60	66.0	66.1	60
Fat................	"	51.2	52.1	45	60.4	60.3	43

Sources: (33) and (36)

Table 8.--Per capita food consumption, income elasticities and changes, actual and calculated, Brazil, 1956-58 and 1959-61

Food group	Daily per capita consumption		Estimated income elasticity	Annual compound rate of change in per capita consumption	
	1956-58	1959-61		Actual	Calculated[1]
	- - - -Calories- - -		- - - - - - - -	Percent - - - - - - -	
Cereals......................	898	932	0.15	1.25	0.40
Sugar........................	387	417	.30	2.52	.80
Starchy roots................	478	503	-.10	1.71	-.27
Pulses[2]......................	212	218	.20	.93	.54
Nuts[3]........................	20	23	.20	4.77	.54
Fruits and vegetables........	123	128	.50	1.34	1.34
Meat.........................	220	205	.70	-2.33	1.88
Fish.........................	6	7	.60	5.27	1.61
Fats and oils[4]...............	152	160	.80	1.72	2.14
Milk and cheese..............	96	106	.90	3.36	2.41
Eggs.........................	14	15	1.00	2.33	2.68
Total....................	2,606	2,714	0.29	1.36	0.78

[1] Average annual compound per capita disposable income increase of 2.68 percent from constant price index times income elasticity shown.

[2] Includes dry beans, peas, lentils, and food use of peanuts and soybeans.

[3] Mostly coconuts; includes other tree nuts and cocoa.

[4] Includes slaughter fats, vegetable oils, and butter.

Sources: (7), (33), table 3, and unpublished data.

Table 9.--Food, nonfood, and total consumption of selected food commodities, Brazil, 1959-61 and projections for 1970[1]

Food commodity	Estimated consumption, 1959-61			World food budget projection, 1970			Adjusted projection, 1970[2]		
	Food	Nonfood[3]	Total	Food	Nonfood[3]	Total	Food	Nonfood[3]	Total
	1,000 tons								
Cereals:									
Corn	2,380	6,006	8,386	3,600	8,400	12,000	3,715	8,669	12,384
Rice (rough)	4,146	532	4,678	5,800	700	6,500	5,898	712	6,610
Wheat	2,153	108	2,261	3,089	110	3,199	3,138	112	3,250
Total	8,679	6,646	15,325	12,489	9,210	21,699	12,751	9,493	22,244
Sugar:									
Centrifugal	2,683	0	2,683	3,800	0	3,800	4,066	0	4,066
Noncentrifugal	272	0	272	393	0	393	403	0	403
Total	2,955	0	2,955	4,193	0	4,193	4,469	0	4,469
Starchy roots:									
Cassava	12,481	5,069	17,550	16,591	6,459	23,050	16,591	6,459	23,050
Sweetpotatoes	1,257	232	1,489	1,666	275	1,941	1,666	275	1,941
Potatoes	859	260	1,119	1,139	300	1,439	1,139	300	1,439
Total	14,597	5,561	20,158	19,396	7,034	26,430	19,396	7,034	26,430
Dried beans	1,501	153	1,654	2,193	154	2,347	2,215	155	2,370
Vegetables	952	122	1,074	1,577	150	1,727	1,735	165	1,900
Fruit:									
Bananas	2,342	769	3,111	3,514	900	4,414	3,728	955	4,683
Other fruit[4]	3,732	349	4,081	5,687	500	6,187	6,034	530	6,564
Total	6,076	1,118	7,192	9,201	1,400	10,601	9,762	1,485	11,247
Meat	2,032	0	2,032	2,980	0	2,980	3,114	0	3,114
Fats and oils:									
Vegetable oils	210	0	210	353	0	353	397	0	397
Slaughter fats	260	0	260	410	0	410	415	0	415
Butter	27	0	27	48	0	48	58	0	58
Total	497	0	497	811	0	811	870	0	870
Milk[5]	4,718	394	5,112	6,750	541	7,291	7,155	573	7,728
Eggs	264	17	281	431	25	456	479	28	507
Cocoa beans	15	0	15	20	0	20	20	0	20
Calories[6]	2,714			2,850			2,940		

[1] Commodity basis, apparent food consumption at retail level. Excludes small amounts of rye, barley, oats, and other cereal products; peas, lentils, and food use of peanuts, soybeans, coconuts, and tree nuts; and fish which accounted for 52 calories per capita in 1959-61 or 1.9 percent of daily caloric consumption. [2] Adjusted upward to allow for a 1.6 percent annual compound rate of increase in per capita disposable income from 1959-61 to 1970 instead of the 1.0 percent increase assumed in the world food budget projection. [3] Excludes nonfood use from commodity processing (extraction) for grains, cassava, and cocoa beans which amounts are included under food (commodity basis). Includes seed, waste, feed, and industrial use deductions except for sugar, meat, fats and oils, products, all considered as food use. [4] Mostly citrus and pineapple. [5] Total milk requirements, including processing. [6] Calories per capita per day. Includes allowance for omissions.

Sources: (33), (36), and unpublished data.

Table 10.--Value of exports of specified agricultural commodities and other exports, Brazil, 5-year averages, 1955-64, and annual 1960-65

Commodity	1955-59	1960-64	1960	1961	1962	1963	1964	1965[1]
	Million dollars							
Coffee	828.0	714.8	712.7	710.4	642.7	748.3	759.7	706.6
Cotton	64.4	98.0	45.6	109.7	112.2	114.2	108.3	95.7
Cocoa beans & product	98.2	60.1	98.5	62.4	41.6	51.3	46.4	41.4
Sugar	38.9	53.7	57.8	65.6	39.5	72.4	33.1	56.7
Sisal & agave	13.2	26.9	21.0	23.2	22.9	33.6	33.9	22.7
Tobacco	17.5	24.4	18.7	26.9	23.8	24.2	28.6	26.4
Meat and products	19.6	18.3	14.9	23.7	17.6	12.5	23.1	47.4
Castor oil & beans	13.6	18.1	9.7	23.9	14.8	17.8	24.4	26.8
Other veg. oils & oil seeds	10.6	12.2	2.7	12.8	21.8	15.7	7.9	20.9
Carnauba wax	17.3	12.5	17.8	14.1	10.0	10.2	10.2	10.8
Brazil nuts	11.7	11.8	14.3	15.6	9.9	8.9	10.4	11.6
Oranges	4.9	5.3	6.1	6.0	4.7	6.2	3.7	7.4
Bananas	10.2	4.1	4.6	3.8	3.2	2.9	5.8	6.3
Other fruits & prod.	2.4	1.9	1.1	1.4	1.2	2.8	3.0	4.6
Vegetables & products	2.9	3.3	4.3	3.7	1.7	1.3	5.6	8.4
Hides & skins[2]	9.2	8.1	11.2	9.0	6.7	5.9	7.7	14.1
Menthol & peppermint oil	4.0	8.9	5.0	10.8	10.7	10.3	8.4	5.2
Rice	3.3	3.8	([3])	13.2	4.7	--	.9	23.8
Mate	14.1	8.3	9.0	9.5	7.5	7.7	7.8	6.9
Animal feeds[4]	1.4	10.5	7.6	11.1	9.7	15.7	8.6	22.9
Total	1,185.4	1,105.0	1,062.6	1,156.8	1,006.9	1,161.9	1,137.5	1,166.6
Other agricultural	15.6	24.5	11.4	12.8	10.6	44.9	41.9	72.3
Total agricultural	1,201.0	1,129.5	1,074.0	1,169.6	1,017.5	1,206.8	1,179.4	1,238.9
Total exports	1,364.4	1,344.5	1,268.8	1,403.0	1,214.2	1,406.5	1,429.8	1,595.5
Agricultural as percent of total exports	88	84	85	83	84	86	82	78

[1] Preliminary. [2] Raw or pickled hides of domestic animals. [3] Less than $50,000. [4] Oilmeal and cake, mill feeds, meat and bone meal, and other products.

Sources: (11), (25), and Brazilian Government reports.

Table 11.--Value of imports of specified agricultural commodities and other imports, Brazil, 5-year averages, 1955-64, and years 1960-65

Commodity	1955-59	1960-64	1960	1961	1962	1963	1964	1965[1]
	- - - -	- - - -	- - - -	Thousand dollars	- - - -	- - - -	- - - -	- - - -
Wheat..................	119,631	163,214	142,660	138,892	160,953	164,004	209,560	135,899
Wheat flour...........	6,895	648	13	579	632	888	1,128	1,067
Barley................	442	2,945	1,920	2,920	2,990	3,489	3,405	4,545
Malt..................	9,877	8,676	8,330	8,072	8,690	9,526	8,761	7,974
Hops..................	2,251	1,991	1,675	1,866	1,913	2,163	2,339	2,128
Milk, dry.............	3,635	3,580	741	2,935	3,528	5,518	5,178	6,802
Dried fruit...........	2,338	2,259	1,925	2,110	2,321	2,005	2,934	2,346
Fresh fruit...........	10,935	10,489	6,221	7,203	11,455	15,604	11,960	12,238
Canned fruit..........	1,863	2,733	1,606	1,814	2,838	3,970	3,436	3,470
Garlic................	2,386	3,711	3,016	2,017	4,448	4,695	4,378	2,525
Other vegetables.......	2,096	3,957	2,721	1,580	4,089	6,059	5,343	2,743
Olive oil.............	6,730	5,875	6,951	4,877	6,801	4,485	6,261	6,732
Other fats and oils....	736	3,116	377	560	2,049	2,474	10,119	7,375
Natural rubber.........	12,156	11,878	21,381	11,647	10,627	10,970	4,765	1,716
Total..............	181,971	225,072	199,537	187,072	223,334	235,850	279,567	197,560
Other agricultural...	13,888	20,495	12,625	16,920	21,616	26,961	24,352	13,951
Total agricultural.....	195,859	245,567	212,162	203,992	244,950	262,811	303,919	211,511
Total imports..........	1,351,379	1,429,515	1,462,138	1,460,093	1,475,047	1,486,848	1,263,451	1,096,423
Agricultural as percent of total imports.....	14	17	15	14	17	18	24	19

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[1] Preliminary.

Sources: (11), (25), and Brazilian Government reports.

Table 12.--Trade indices: Terms of trade, importing capacity, total exports, coffee exports, and total imports, Brazil, 5-year averages, 1950-64, and annual, 1950-66

[1953 = 100]

Periods	Terms of trade[1]	Importing capacity[2]	Total exports: Quantum[3]	Total exports: Value in dollars[4]	Total exports: Prices in dollars[5]	Coffee exports: Quantum[3]	Coffee exports: Value in dollars[4]	Coffee exports: Prices in dollars[5]	Total imports: Quantum[3]	Total imports: Value in dollars[4]	Total imports: Prices in dollars[5]
	Index										
5-year averages											
1950-54.......	102	99	97	99	102	94	92	99	119	121	101
1955-59.......	115	120	104	88	85	97	76	80	139	103	74
1960-64.......	95	116	122	87	71	109	66	61	143	109	76
Years:											
1950..........	93	95	102	88	86	95	799	83	89	82	93
1951..........	95	104	109	115	106	105	97	92	135	151	112
1952..........	90	81	90	92	102	102	96	94	131	150	115
1953..........	100	100	100	100	100	100	100	100	100	100	100
1954..........	134	115	86	101	117	70	87	124	142	124	87
1955..........	118	118	100	92	92	68	78	89	126	99	79
1956..........	113	122	108	96	89	108	95	88	119	94	79
1957..........	117	117	100	90	90	92	78	85	145	113	78
1958..........	119	114	96	81	84	83	63	76	145	103	71
1959..........	109	128	117	83	71	112	67	60	160	104	65
1960..........	101	119	118	82	69	108	66	61	161	111	69
1961..........	97	124	128	91	71	109	65	60	151	111	74
1962..........	84	99	118	79	67	105	59	56	140	112	80
1963..........	92	120	130	91	70	125	69	55	146	113	77
1964[6].........	99	115	116	93	80	96	70	73	118	96	81
1965[6].........	98	98	114	92	81	87	66	76	89	81	91

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[1] Ratio between indices of export prices and import prices. [2] Terms of trade multiplied by the quantum of exports. [3] Weighted index, Laspeyre's method, movable base. [4] Simple index. [5] Value index divided by quantum index. [6] Preliminary.

Source: (10)

Table 13.--Value of imports, Brazil, 1949-51 and 1959-61

Imports	1949-51	1959-61	Imports	1949-51	1959-61
	Percent			Percent	
Consumer goods, durable.............	5.2	4.1	Raw materials and intermediate products...........................	31.0	37.1
Consumer goods, nondurable...........	7.9	1.4	Capital goods.......................	44.3	39.4
Fuels...............................	11.6	18.0	Total...........................	100.0	100.0

Source: (28).

Table 14.--Value and percentage of agricultural and total trade with selected countries, associations and regions, Brazil, selected 5-year averages and years

Countries, associations, and regions	1955-59		1960-64		1960		1961		1962		1963[1]		1964[1]	
	Agri-cultural	Total	Agri-cultural	Total	Agri-cultural	Total	Agri-cultural	Total	Agri-cultural	Total	Agri-cultural	Total	Agri-cultural	Total
	Million dollars													
Exports														
United States........	565.0	624.4	455.3	523.3	490.2	563.7	478.4	562.8	416.4	484.8	470.7	530.9	420.8	474.3
Western Europe[2]......	436.1	474.7	467.6	534.8	409.4	455.7	469.1	537.3	409.9	482.8	528.0	584.4	521.4	613.8
Latin America[3].......														
LAFTA countries[4]...	78.7	120.6	47.9	93.3	50.3	86.4	47.4	95.2	40.5	75.7	41.7	76.0	59.5	133.0
Others[5]............	1.0	11.3	.5	4.5	.2	2.6	1.2	2.6	.3	3.0	.4	7.8	.7	6.9
Total............	79.7	131.9	48.4	97.8	50.5	89.0	48.6	97.8	40.8	78.7	42.1	83.8	60.2	139.9
Communist countries[6].	38.4	43.5	69.0	81.3	61.7	72.1	64.7	75.8	62.5	74.6	83.3	95.4	72.6	88.4
Rest of world........	81.8	89.9	89.2	107.3	62.2	90.4	108.8	128.6	87.9	92.9	82.7	112.5	104.4	113.4
Total.............	1,201.0	1,364.4	1,129.5	1,344.5	1,074.0	1,270.9	1,169.6	1,402.3	1,017.5	1,213.8	1,206.8	1,407.0	1,179.4	1,429.8
Imports														
United States........	39.1	431.2	111.2	461.6	56.2	443.2	124.4	514.8	94.5	457.1	116.4	456.5	164.4	436.5
Western Europe[2]......	29.5	446.9	22.4	463.5	24.9	510.2	21.7	476.9	25.7	503.6	24.5	475.8	15.3	351.2
Latin America[3]														
LAFTA countries[4]...	117.6	128.4	81.3	122.9	94.0	108.7	29.8	44.9	81.7	128.7	88.4	164.0	112.4	167.7
Others[5]............	.1	196.4	.3	104.9	--	120.2	--	101.1	--	109.5	1.6	98.4	--	95.3
Total............	117.7	324.8	81.6	227.8	94.0	228.9	29.8	146.0	81.7	238.2	90.0	262.4	112.4	263.2
Communist countries[6].	4.2	41.5	17.6	72.7	16.7	82.1	15.0	70.2	30.9	65.1	22.2	76.6	3.1	69.3
Rest of world........	5.3	107.0	12.8	203.9	20.3	197.7	13.1	252.2	12.1	211.0	9.7	215.5	8.7	143.3
Total.............	195.8	1,351.4	245.6	1,429.5	212.1	1,462.1	204.0	1,460.1	244.9	1,475.0	262.8	1,486.8	303.9	1,263.5
Exports														
United States........	47.0	45.8	40.3	38.9	45.7	44.3	40.9	40.1	40.9	39.9	39.0	377.3	35.7	33.2
Western Europe[2]......	36.3	34.8	41.4	39.8	38.1	35.9	40.1	38.3	40.3	39.8	43.7	41.5	44.2	42.9
Latin America[3]														
LAFTA countries[4]...	6.6	8.8	4.2	7.0	4.7	6.8	4.1	6.8	4.0	6.2	3.5	5.4	5.0	9.3
Others[5]............	.1	.8	.1	.3	--	.2	.1	.2	--	.3	--	.6	.1	.5
Total............	6.7	9.6	4.3	7.3	4.7	7.0	4.2	7.0	4.0	6.5	3.5	6.0	5.1	9.8
Communist countries[6].	3.2	3.2	6.1	6.0	5.7	5.7	5.5	5.4	6.2	6.1	6.9	6.8	6.1	6.2
Rest of world........	6.8	6.6	7.9	8.0	5.8	7.1	9.3	9.2	8.6	7.7	6.9	8.0	8.9	7.9
Total.............	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Imports														
United States........	20.0	31.9	45.3	32.3	26.5	30.3	61.0	35.3	38.6	31.0	44.3	30.7	54.1	34.6
Western Europe[2]......	15.1	33.1	9.1	32.4	11.7	34.9	10.6	32.6	10.5	34.2	9.3	32.0	5.0	27.8
Latin America[3]														
LAFTA countries[4]...	60.0	9.5	33.1	8.6	44.3	7.5	14.6	3.1	33.4	8.7	33.6	11.0	37.0	13.3
Others[5]............	.1	14.5	.1	7.3	--	8.2	--	6.9	--	7.4	.6	6.6	--	7.5
Total............	60.1	24.0	33.2	15.9	44.3	15.7	14.6	10.0	33.4	16.1	34.2	17.6	37.0	20.8
Communist countries[6].	2.1	3.1	7.2	5.1	7.9	5.6	7.4	4.8	12.6	4.4	8.5	5.2	1.0	5.5
Rest of world........	2.7	7.9	5.2	14.3	9.6	13.5	6.4	17.3	4.9	14.3	3.7	14.5	2.9	11.3
Total.............	100	100	100	100	100	100	100	100	100	100	100	100	100	100

[1] Preliminary. [2] Non-Communist countries. [3] Western Hemisphere countries, excluding the United States, Canada and dependencies. [4] Latin American Free Trade Association members: Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, and Uruguay. This Association became effective in 1960; for earlier years, trade with these countries is listed as LAFTA country trade for comparison purposes. [5] Non-LAFTA country trade. [6] Includes USSR, Eastern Europe, and Cuba.

Sources: (2), (11), (17), (19), and unpublished data.

Table 15.--Incidence of tariffs and exchange control costs on imports of processed and unprocessed foodstuffs compared with all commodities, as a percentage of CIF value Brazil, March 1962[1]

Category	Import charges on goods entering		Import charges on all goods in category	
	Weighted average[2]	Average[3]	Average[4]	Tariff and exchange costs[5]
	Percent			
Unprocessed foodstuffs............	1.1	9.5	43	[6] 264
Processed foodstuffs.............	50.5	56.3	91	[7] 280
All commodities..................	28.8	40.1	60	[8] 168

[1] The ad valorem includes tariff duties, rate of custom clearance, dues payable on port facilities and additional cost (estimated at 200 percent of the c.i.f. value) of foreign exchange for goods classified in the Special Category. Does not include the financing of the prior deposit, costing approximately 9 percent. [2] Weighted averages (weighing factor, imports) of sample representing at least 85 percent of total imports in recent years. [3] Simple arithmetic means of duties and charges on products included in the sample referred to above (excluding goods that are imported on a small scale). [4] Simple arithmetic means of the duties and charges that would correspond to each and all of the Brussels Tariff Nomenclature items in the categories shown. [5] Calculated to include tariffs, customs clearance rate (5 percent for almost all products) and the higher cost of foreign exchange for imports in the special category. [6] Includes 13 product categories: Live animals for breeding and for meat, live sheep and goats, chilled and frozen beef, apples, bananas, coffee beans, mate, wheat, hulled rice, raw sugar, cocoa beans, and leaf tobacco. [7] Includes 14 product categories: Powdered and canned milk, butter, cheese, wheat flour, pork lard, cottonseed oil, sunflowerseed oil, olive oil, prepared and preserved meats, meat extracts, prepared and preserved fish, prepared and preserved vegetables, fruit, and wine. [8] Includes 125 products.

Source: (21).

Table 16.--Total land area, land in farms and crops, number of farms, farm income, rural and urban population, and total population by States, territories, and regions, Brazil, 1960

States, territories, and regions	Land--			Number of farms	Agricultural income	Population		
	Area	In farms	In crops			Rural	Urban	Total
	1,000 sq. kilometers	1,000 hectares	1,000 hectares	1,000	Million cruzeiros	1,000	1,000	1,000
Rondonia[1]	243	303	12	1	Negl.	40	31	71
Acre	153	17,596	19	4	Negl.	126	34	160
Amazonas	1,564	6,690	125	48	6,460.6	482	239	721
Roraima[1]	230	857	2	1	Negl.	17	13	29
Para	1,248	5,647	292	83	6,329.6	920	631	1,551
Amapa[1]	140	1,248	8	1	Negl.	33	35	69
North[2]	3,581	32,341	458	138	12,790.2	1,618	983	2,601
Maranhao	329	8,460	1,170	262	12,609.8	2,044	449	2,492
Piaui	251	9,492	471	87	4,406.3	965	298	1,263
Ceara	148	11,399	1,640	123	18,350.9	2,213	1,125	3,338
Rio Grande do Norte	53	4,345	627	50	9,534.6	722	435	1,157
Paraiba	56	4,088	1,003	119	18,414.3	1,310	708	2,018
Pernambuco	98	6,281	1,501	261	23,990.7	2,280	1,857	4,137
Alagoas	28	1,934	426	63	9,147.9	843	428	1,271
Fernando de Noronha[3]	(4)	(4)	(4)	(4)	n.a.	(4)	1	1
Northeast[5]	966	45,999	6,838	965	96,454.5	10,377	5,301	15,677
Sergipe	22	1,474	204	65	4,777.8	464	296	760
Bahia	561	18,004	2,264	383	38,527.8	3,907	2,084	5,991
Minas Gerais	583	39,372	3,673	372	87,509.5	5,858	3,940	9,799
Serra dos Aimores[6]	11	884	316	22	(7)	350	34	384
Espirito Santo	39	2,882	726	55	9,987.0	809	380	1,189
Rio de Janeiro	43	2,928	588	51	25,674.7	1,326	2,077	3,403
Guanabara	1	43	21	6	3,174.5	84	3,223	3,307
East	1,260	65,587	7,792	954	169,651.3	12,798	12,034	24,833
Sao Paulo	249	20,055	4,973	319	144,866.4	4,825	8,150	12,975
Parana	200	11,708	3,471	271	80,541.3	2,950	1,328	4,278
Santa Catarina	96	5,986	1,013	159	25,979.1	1,451	695	2,147
Rio Grande do Sul	282	22,328	3,796	382	71,369.2	3,003	2,446	5,449
South	826	60,077	13,253	1,131	322,756.0	12,229	12,619	24,849
Mato Grosso	1,231	32,436	418	48	11,077.4	546	364	910
Goias	642	28,867	995	111	18,438.0	1,355	599	1,955
Distrito Federal	6	142	4	Negl.	Negl.	52	90	142
Central West	1,879	61,445	1,417	159	29,515.4	1,953	1,053	3,007
Brazil	8,512	265,449	29,758	3,347	631,167.4	38,975	31,990	70,967

[1] Territory. [2] Includes disputed area of Amazonas-Para of 2,600 square kilometers not separately shown. [3] Island territory, including Rocas. [4] Less than 500 units. [5] Includes disputed area of Piaui-Ceara of 2,600 square kilometers. [6] Former disputed area of Minas Gerais-Espirito Santo. Borders settled in 1963 by Treaty of Bananal. [7] Not separately shown.

Sources: (5), (14), and (15).

Table 17.--Number and size of land holdings and distribution of area in farms, in crops, and in crops as a percentage of area in farms, Brazil 1960

Size of land holdings (hectares)	Number of units	Distribution of area in--		
		Farms	Crops	Crops as a percentage of area in farms
	- - - - - - - - - - Percent - - - - - - - - - - - - -			
Up to 10	45	2	13	67
10 to 100	45	18	45	28
100 to 1,000	9	33	30	10
1,000 to 10,000	1	27	10	4
Over 10,000	--	20	2	1
Total	100	100	100	11

Source: (11) and (15).

Table 18.--Land use and productivity indicators, census years

Land use and ratios	1940	1950	1960	Compound rate increase	
				1940-50	1950-60
	- - - 1,000 hectares - - -			- - - Percent - - - -	
Land Use					
Total land area	851,200	851,200	851,200	n.a.	n.a.
Land in farms	198,000	232,000	265,000	1.6	1.3
Land in crops	18,200	19,100	29,800	0.5	4.5
	- - - - 1,000 units - - - -			- - - Percent - - - -	
Number of Farms	1,900	2,060	3,350	0.8	5.0
	- - - - Hectares - - - - -			- - - Percent - - - -	
Land Use Ratios					
Total land per capita	20.57	16.31	12.11	-2.3	-2.9
Farm land per capita	4.78	4.45	3.77	-0.7	-1.6
Crop land per capita	.44	.37	.42	-1.6	1.3
Farm land per farm	104.21	112.62	79.10	0.8	-3.5
Crop land per farm	9.58	9.27	8.90	-0.3	-0.4
Farm land per farm worker[1]	20.84	23.43	22.65	1.2	-0.3
Crop land per farm worker	1.92	1.93	2.55	0.1	2.8
Farm land per tractor	58,235	27,619	4,173	-7.2	-16.9
Crop land per tractor	5,353	2,274	469	-8.2	-14.6
Farm land per plow	395	325	257	-1.9	-2.3
Crop land per plow	36	27	29	-2.8	0.7
Farm land per ton fertilizer	8,250	2,607	869	-10.9	-10.4
Crop land per ton fertilizer	758	215	98	-11.8	-7.6

[1] Based on Demographic Census of persons present over 10 years old and providing service to agriculture.

Sources: (13), (14), (15), and unjustified data.

able 19.--Gross value of agricultural output per unit of input of $100 of fixed investment, $100 of cash expenses, man employed, and hectare cultivated, Brazil, 1950

Region	Gross value of agricultural output per unit of input[1]--			
	$100 of fixed investment	$100 of cash expense	Man employed	Hectare cultivated
	Dollars			
North	81	370	115	160
Northeast	68	600	111	86
East	45	550	167	115
South	45	440	332	132
Central West	34	510	193	122
Brazil	47	490	204	117

[1] Cruzeiros converted to dollars at the 1950 free rate of 32.39 per dollar.

Sources: (5), (13), and table 16.

Table 20.--Fertilizer production, imports, and apparent consumption in nutrient elements, Brazil, 1950-65[1]

Year	Imports	Production	Apparent consumption
	1,000 tons		
1950	82	7	89
1951	114	7	121
1952	63	9	72
1953	107	9	116
1954	110	13	123
1955	137	25	162
1956	141	25	166
1957	164	43	207
1958	194	56	250
1959	147	79	226
1960	211	93	304
1961	163	82	245
1962	161	77	238
1963	249	58	307
1964	196	52	248
1965[2]	250	50	300

[1] Includes N_1 P_2 O_5 and K_2O. Distribution of consumption by type for 1961-63 was as follows: Nitrogen, 21 percent; phosphorus, 50 percent; and potash, 29 percent. [2] Preliminary.

Sources: (10) and (11).

Table 21.--Area in crops by State, territory, and region according to census reports an official estimates with changes, 1950 and 1960, and official estimates as a percentage of census report, 1960

State, territory, and region	Census reports			Official estimates			Official estimates as percent of census report for 1960
	July 1, 1950	Sept. 1, 1960	Percentage increase	Dec. 31, 1950	Dec. 31, 1960	Percentage increase	
	1,000 hectares	1,000 hectares	Percent	1,000 hectares	1,000 hectares	Percent	Percent
Rondonia[1]	4	12	200	(2)	4	1,142	34
Acre	14	19	36	12	13	8	69
Amazonas	53	125	136	8	29	262	23
Roraima[1]	1	2	100	(2)	2	335	77
Para	162	292	80	116	179	54	61
Amapa[1]	1	8	1,176	1	7	600	81
North[3]	235	458	95	137	234	71	51
Maranhao	329	1,170	256	289	691	139	59
Piaua	225	471	109	136	260	91	55
Ceara	827	1,640	98	873	1,136	30	69
Rio Grande do Norte	444	627	41	527	682	29	109
Paraiba	660	1,003	52	556	892	60	89
Pernambuco	999	1,501	50	817	1,297	59	86
Alagoas	282	426	51	279	448	61	105
Fernando de Noronha[4]	n.a.	n.a.	--	n.a.	n.a.	--	--
Northeast[5]	3,766	6,838	82	3,477	5,406	55	79
Sergipe	136	204	50	105	166	58	81
Bahia	1,372	2,264	65	864	1,429	65	63
Minas Gerais	2,937	3,673	25	2,893	3,784	31	103
Serra dos Aimores[6]	55	318	478	(6)	(6)	--	--
Espirito Santo	588	726	23	419	636	52	88
Rio de Janeiro	588	588	--	392	533	36	91
Guanabara	22	21	-5	(6)	10	--	47
East	5,698	7,794	37	4,673	6,558	40	88
Sao Paulo	4,257	4,973	17	4,890	5,135	5	103
Parana	1,358	3,471	156	1,469	3,147	114	91
Santa Catarina	670	1,013	51	553	795	44	78
Rio Grande do Sul	2,503	3,796	52	2,083	3,299	58	87
South	8,788	13,253	51	8,995	12,376	38	93
Mateo Grosso	143	418	192	116	377	225	90
Goias	465	995	114	377	858	128	86
Distrito Federal	(7)	4	--	(7)	(7)	--	--
Central West	608	6,417	306	493	1,235	353	176
Brazil	19,095	29,760	56	17,775	25,809	45	87

[1] Territories. [2] Less than 500 units. [3] Includes disputed area of Amazonas-Para not separately shown. [4] Island territory, including Rocas. [5] Includes disputed area of Piaua-Ceara. [6] Former disputed area of Minas Gerais-Espirito Santo. Borders settled in 1963 by Treaty of Bananal. [7] Not separately shown.

Sources: (11), (13), (14), and (15).

ble 22.--Indices of agricultural production for field crops, tree and vine crops, total rops, livestock, food, and total, Brazil, 5-year averages 1935-64, and annual 1950-66[1]

[1957-59 = 100]

Period	Crop production					Livestock products[4]	Food production[5]	Total agricultural production[6]	Population[7]
	Field crops[2]			Tree and vine crops[3]	Total				
	Area	Yield	Production						
	Index								
5-year averages									
1935-39.............	56	98	55	71	60	56	47	53	59
1940-44.............	60	98	59	51	56	50	50	50	65
1945-49.............	69	96	66	56	63	n.a.	n.a.	n.a.	74
1950-54.............	83	100	83	61	76	74	77	76	84
1955-59.............	99	99	98	87	95	95	97	95	97
1960-64.............	124	104	129	81	113	109	120	109	113
Years									
1950................	80	100	80	63	74	67	72	71	79
1951................	80	101	81	56	73	70	73	71	81
1952................	80	99	79	62	73	73	75	75	84
1953................	85	98	83	64	77	78	80	78	86
1954................	92	100	92	59	81	82	87	81	89
1955................	96	99	95	74	88	84	90	87	91
1956................	99	98	97	60	85	91	93	86	94
1957................	100	100	100	78	93	96	99	94	97
1958................	97	99	96	94	95	102	98	97	100
1959................	104	100	104	128	112	102	103	110	103
1960................	112	104	116	88	107	102	110	106	106
1961................	116	105	122	103	116	107	115	114	109
1962................	123	106	131	83	116	113	121	115	113
1963................	131	105	137	88	121	111	126	119	116
1964................	136	101	138	43	107	114	129	108	120
1965[8]...............	141	109	154	114	141	121	144	137	123
1966[8]...............	137	103	141	73	119	125	133	120	127

[1] Weighted aggregative index using weights representing Brazilian prices received by farmers during 1957-59 base period. [2] Includes 22 crops: Wheat, oats, barley, rye, corn, rice alfalfa, sugarcane, potatoes, sweetpotatoes, mandioca, dry beans, peanuts, onions, tomatoes, pineapples, watermelons, cotton, soybeans, castorbeans, jute, sisal, and tobacco. [3] Coffee, cocoa beans, bananas, coconuts, and grapes. [4] Livestock products include estimates of red meat, milk, and wool production; prior to 1950 index does not include milk production. [5] Food production excludes coffee, tobacco, fibers, and castorbeans. [6] Net agricultural production excludes in allowance for feed grains and mill feeds. [7] Population series used for indices purposes varies slightly from table 4, but trends are comparable. [8] Preliminary.

Sources: (35) and table 4.

Table 23.--Trends in area and production of principal crops, Brazil, 1950, and 1960[1]

Commodity	Area			Production		
	1950	1960	Increase	1950	1960	Increase
	1,000 hectares	1,000 hectares	Percent	1,000 tons	1,000 tons	Percent
Grain crops[2]............	7,350	10,879	48	9,817	14,247	45
Starchy roots[3]..........	1,207	1,674	39	14,072	20,009	42
Sugarcane...............	828	1,340	62	32,671	56,927	74
Beans[4]..................	1,886	2,670	42	1,284	1,785	39
Tree and vine crops[5].....	577	936	62	5,112	7,885	54
Vegetables[6].............	97	196	102	500	1,156	131
Oilseeds[7]...............	412	759	84	363	869	139
Coffee..................	2,663	4,420	66	1,071	1,797	68
Tobacco.................	142	213	50	108	167	55
Fibers[8].................	2,755	3,099	13	459	739	61
Alfalfa.................	26	31	19	185	227	23
Total.................	17,943	26,217	46			
DE crop area..........	17,775	25,809	45			
Census crop area.......	19,095	29,760	56			

[1] DE estimates except that 1950 area of flaxseed, soybeans, sisal, jute, and watermelons was estimated on the basis of 1950 production and trends. [2] Corn, rice, wheat, oats, barley, and rye. [3] Mandioca, potatoes, and sweetpotatoes. [4] Kidney beans and broad beans. [5] Cocoa, oranges, grapes, bananas, coconuts, pineapple, tungnuts, and tea. The 1960 area includes additional tree crops totaling 141,000 hectares. [6] Watermelons, onions, tomatoes, and garlic. [7] Castorbeans, peanuts, soybeans, and flaxseed. [8] Cotton, sisal, and jute.

Sources: (11), (15), and table 21.

Table 24.--Output of specified livestock products, Brazil, 5-year averages, 1950-64, and annual 1950-66, and projected 1970

Year	Meat					Milk	Eggs	Wool
	Beef	Pork	Mutton	Goat meat	Total[1]			
	1,000 tons							
5 year averages:								
1950-54........	1,116	383	22	13	1,534	3,067	173	23
1955-59........	1,332	458	23	16	1,829	4,400	250	29
1960-64........	1,376	550	26	19	1,971	5,398	313	25
Years:								
1950...........	1,074	345	20	12	1,451	2,492	148	21
1951...........	1,136	386	18	13	1,553	2,559	150	20
1952...........	1,099	380	25	13	1,517	3,071	168	21
1953...........	1,118	394	26	14	1,552	3,485	191	24
1954...........	1,152	408	23	14	1,597	3,729	209	27
1955...........	1,132	405	24	15	1,576	3,981	227	28
1956...........	1,277	437	22	15	1,751	4,237	239	28
1957...........	1,319	485	23	16	1,843	4,401	255	28
1958...........	1,473	497	24	17	2,011	4,597	262	32
1959...........	1,459	466	23	16	1,964	4,786	269	30
1960...........	1,359	474	22	17	1,872	5,045	282	23
1961...........	1,369	534	24	18	1,945	5,308	294	25
1962...........	1,356	588	26	19	1,989	5,452	310	25
1963...........	1,361	575	27	20	1,983	5,542	329	26
1964...........	1,437	578	30	21	2,066	5,641	350	28
1965[2]..........	1,497	596	34	21	2,148	6,103	366	32
1966[2]..........	1,448	600	35	22	2,105	6,713	385	36

[1] Carcass weight excluding offal, game, other domestic species, and poultry meat. Offal averaged an estimated 10 percent of total slaughter weight in the period 1956-61

[2] Preliminary.

Sources: (11) and (35).

Table 25.--Cattle numbers by State, territory, and region, Brazil, 1950 and 1960

State, territory, and region	Census reports			Official estimates			Official estimates as percent of census report for 1960
	July 1, 1950	Sept. 1, 1960	Percentage increase	Dec. 31, 1950	Dec. 31, 1960	Percentage increase	
	1,000 head	1,000 head	Percent	1,000 head	1,000 head	Percent	Percent
Rondonia[1].............	2	3	50	5	9	80	300
Acre....................	27	33	22	27	39	44	118
Amazonas................	88	139	58	103	179	74	129
Roraina[1]..............	141	166	18	132	168	27	101
Para....................	741	841	13	785	955	22	114
Amapa[1]................	31	46	48	56	52	-7	113
North[2]...............	1,031	1,229	19	1,109	1,403	26	114
Maranhao................	959	1,361	42	1,026	1,497	46	110
Piaui...................	1,039	1,126	8	1,114	1,410	27	125
Ceara...................	1,186	1,343	13	1,528	1,446	-5	108
Rio Grande do Norte....	480	491	2	535	529	-1	108
Paraiba.................	700	760	9	619	799	29	105
Pernambuco..............	894	940	5	1,008	1,143	13	122
Alagoas.................	302	402	33	352	651	85	162
Fernando de Noronha[3]...	1	1	0	1	1	0	100
Northeast[4]...........	5,561	6,424	16	6,183	7,476	21	116
Sergipe.................	415	494	19	403	617	53	125
Bahia...................	4,035	4,570	13	4,426	5,949	34	130
Minas Gerais...........	10,483	11,880	13	11,771	16,213	38	136
Serra dos Aimores[5].....	43	197	358	(6)	(6)	(6)	n.a.
Espirito Santo.........	494	648	31	503	859	71	133
Rio de Janeiro.........	876	1,074	23	1,119	1,389	24	129
Guanabara..............	11	17	55	n.a.	11	n.a.	65
East...................	16,357	18,880	15	18,222	25,038	37	133
Sao Paulo..............	5,880	7,155	22	6,908	10,394	50	145
Parana.................	806	1,630	102	920	1,955	112	120
Santa Catarina.........	1,004	1,196	19	1,386	1,664	20	139
Rio Grande do Sul......	9,211	8,683	-6	8,457	9,611	14	111
South..................	16,901	18,664	10	17,671	23,624	34	127
Mato Grosso............	3,511	5,631	60	4,908	10,061	105	179
Goias..................	3,530	4,848	37	4,562	6,360	39	131
Distrito Federal.......	n.a.	16	n.a.	n.a.	n.a.	n.a.	n.a.
Central West..........	7,041	10,495	49	9,470	16,421	73	156
Brazil................	46,891	55,693	19	52,655	73,962	40	133

[1] Territory. [2] Includes an estimated 1,000 head for disputed territory of Amazones-Para not separately shown. [3] Island territory, including Rocas. [4] Includes disputed area of Piaui-Ceara. [5] Former disputed area of Minas Gerais-Expirito Santo. Borders settled in 1963 by Treaty of Bananal. [6] Not separately shown.

Sources: (11), (13), and (15).

Table 26.--Cattle balance: Numbers imports, slaughter, net addition to herd, offtake, and offtake ratio, Brazil, 5-year averages, 1950-64 and annual 1950-66

Years	Numbers, December 31	Imports	Slaughter[1]	Net addition to herd[2]	Offtake[3]	Offtake ratio[4]
	- - - - - -	- - - -	1,000 head	- - - -	- - - - - -	Percent
5-year averages:						
1950-54......	56,071	22	6,167	1,753	8,897	14.5
1955-59......	68,820	4	7,056	2,426	9,477	14.3
1960-64......	78,621	17	7,186	2,241	9,409	12.2
Years:						
1950.........	52,655	44	5,965	718	6,639	12.8
1951.........	53,518	35	6,452	863	7,280	13.8
1952.........	55,854	19	6,003	2,336	8,320	15.5
1953.........	57,626	10	6,245	1,772	8,007	14.3
1954.........	60,700	4	6,171	3,074	9,241	16.0
1955.........	63,608	7	6,031	2,908	8,932	14.7
1956.........	66,695	6	6,574	3,087	9,655	15.2
1957.........	69,548	6	7,033	2,853	9,880	14.8
1958.........	71,420	1	7,857	1,872	9,728	14.0
1959.........	72,829	2	7,783	1,409	9,190	12.9
1960.........	73,962	16	7,207	1,133	8,324	11.4
1961.........	76,176	15	7,141	2,214	9,340	12.6
1962.........	79,078	19	6,989	2,902	9,872	13.0
1963.........	79,855	24	7,065	777	7,818	9.9
1964.........	84,035	12	7,528	4,180	11,691	13.9
1965[5]........	90,629	-2	7,843	6,594	14,439	15.9
1966[5]........	n.a.	n.a.	7,625	n.a.	n.a.	n.a.

[1] Includes allowances for home slaughter. [2] Number on hand this year minus numbers on hand last year. [3] Offtake is defined as births minus deaths; used for slaughter, net exports, and net additions to the herd; exports are negligible. [4] Offtake devided by numbers on hand at beginning of year. [5] Preliminary.

Sources: (11), (24), (25), and (30).

Table 27.--Hog balance: Numbers, slaughter, net addition to herd, offtake and offtake ratio, Brazil, 5-year averages, 1950-64, and annual 1950-65

Years	Numbers, December 31	Slaughter[1]	Net addition to herd[2]	Offtake[3]	Offtake ratio[4]
	1,000 head				Percent
5-year averages:					
1950-54.....	30,559	6,014	2,229	8,243	29.3
1955-59.....	43,259	7,012	2,305	9,318	23.1
1960-64.....	53,126	8,256	2,456	10,713	20.8
Years:					
1950........	26,059	5,408	1,907	7,315	30.3
1951........	27,801	5,986	1,742	7,728	29.7
1952........	30,916	6,140	3,115	9,255	33.3
1953........	32,721	6,207	1,805	8,012	25.9
1954........	35,296	6,328	2,575	8,903	27.2
1955........	38,606	6,474	3,310	9,784	27.7
1956........	41,416	6,831	2,810	9,641	25.0
1957........	44,190	7,167	2,774	9,941	24.0
1958........	45,262	7,480	1,072	8,552	19.4
1959........	46,823	7,109	1,561	8,670	19.2
1960........	47,944	7,092	1,121	8,213	17.5
1961........	50,051	8,007	2,107	10,114	21.1
1962........	52,941	8,832	2,890	11,722	23.4
1963........	55,990	8,583	3,049	11,632	22.0
1964........	58,705	8,768	3,115	11,883	20.2
1965[5].......	63,020	8,769	4,215	12,984	20.6
1966[5].......	n.a.	8,770	n.a.	n.a.	n.a.

[1] Includes an allowance for home slaughter. [2] Numbers on hand this year minus numbers on hand last year. [3] Offtake is defined as births minus deaths; used for slaughter, net exports, and net additions to the herd. Both exports and imports were negligible over the period. [4] Offtake divided by numbers on hand at beginning of year and raised to a percentage. [5] Preliminary.

Sources: (11), (24), (25), and (30).

Table 28.--Sheep balance: Numbers, imports, slaughter, exports, net addition to herd, offtake, and offtake ratio, Brazil, 5-year averages, 1950-64, and annual 1950-64

Years	Numbers, December 31	Imports	Slaughter[1]	Exports	Net addition to herd[2]	Offtake[3]	Offtake ratio[4]
	1,000 head	1,000 head	1,000 head	1,000 head	1,000 head	1,000 head	1,000 head
5-year averages:							
1950-54.........	16,133	47	1,455	Negl.	782	2,190	13.6
1955-59.........	19,286	16	1,476	Negl.	307	1,766	9.1
1960-64.........	19,997	47	1,651	Negl.	582	2,186	10.8
Years:							
1950............	14,251	--	1,284	Negl.	702	1,986	13.9
1951............	15,891	39	1,229	Negl.	1,640	2,830	17.8
1952............	16,264	49	1,581	Negl.	373	1,905	11.7
1953............	16,800	60	1,666	Negl.	536	2,142	12.8
1954............	17,459	89	1,516	Negl.	659	2,086	11.9
1955............	18,484	54	1,562	Negl.	1,025	2,533	13.7
1956............	18,867	11	1,448	Negl.	383	1,820	9.6
1957............	20,164	8	1,421	Negl.	1,297	2,710	13.4
1958............	19,921	5	1,491	Negl.	-243	1,243	6.2
1959............	18,995	1	1,453	Negl.	-926	526	2.8
1960............	18,162	4	1,427	Negl.	-833	590	3.2
1961............	19,168	18	1,574	Negl.	1,006	2,562	13.4
1962............	19,718	45	1,676	Negl.	550	2,181	11.1
1963............	21,033	149	1,700	Negl.	1,315	2,866	13.6
1964............	21,906	19	1,877	Negl.	873	2,731	12.5
1965[5]..........	22,327	2	2,088	Negl.	421	2,507	11.2
1966[5]..........	n.a.	n.a.	2,100	n.a.	n.a.	n.a.	n.a.

[1] Includes an allowance for home slaughter. [2] Numbers on hand this year minus numbers on hand last year. [3] Offtake is defined as births minus deaths; used for slaughter, net exports, and net additions to the herd. [4] Offtake divided by numbers on hand at beginning of year. [5] Preliminary.

Sources: (11), (24), (25), and (30).

Table 29.--Comparisons of general wholesale price index with selected price supports, Brazil, 1962-66[1]

Index or commodity	Unit	1962		1963	
		Dollars	Index	Dollars	Index
General price index[3]	n.a.	n.a.	100	n.a.	184
Corn, dent	bu.	1.30	100	1.37	137
Rice, rough, long	bu.	2.03	100	2.39	154
Wheat, all	bu.	2.50	100	3.15	164
Beans, white	bu.	4.89	100	4.54	121
Soybeans, all	bu.	1.25	100	1.76	184
Peanuts, large in shell	bu.	.69	100	.97	184
Cotton, lint, 1.10-1.18 in.	lb.	.20	100	.24	152
Animal products[4]	n.a.	n.a.	100	n.a.	176
	Double index				
General price index[3]			100		100
Corn, dent			100		74
Rice, rough, long			100		84
Wheat, all			100		89
Beans, white			100		66
Soybeans, all			100		100
Peanuts, large in shell			100		100
Cotton, lint, 1.10-1.18 in.			100		83
Animal products[4]			100		96

Index or commodity	1964		1965		1966[2]	
	Dollars	Index	Dollars	Index	Dollars	Index
General price index[3]	n.a.	331	n.a.	484	n.a.	664
Corn, dent	.93	243	1.10	330	1.15	411
Rice, rough, long	1.64	278	1.45	278	1.62	370
Wheat, all	2.49	340	2.31	360	3.28	607
Beans, white	2.34	163	2.40	191	3.71	351
Soybeans, all	1.29	353	1.68	527	1.79	667
Peanuts, large in shell	.81	402	.85	483	1.00	675
Cotton, lint, 1.10-1.18 in.	.21	358	.19	358	.19	441
Animal products[4]	n.a.	278	n.a.	434	n.a.	690
	Double index					
General price index[3]		100		100		100
Corn, dent		73		68		62
Rice, rough, long		84		57		56
Wheat, all		103		74		91
Beans, white		49		39		53
Soybeans, all		107		109		100
Peanuts, large in shell		121		100		102
Cotton, lint, 1.10-1.18 in.		108		74		66
Animal products[4]		84		90		104

[1] Initial prices, generally announced in September before crop is planted, applying principally to southern Brazil. Cruzeiro prices converted to dollar equivalents at the time prices were announced, usually at the free rate. [2] Preliminary. [3] Wholesale price index excluding coffee. [4] Wholesale price index of food products of animal origin.

Sources: Based on (10) and Brazilian Government reports.

Table 30.--Corn: Area, yield, production, exports, and domestic availability, Brazil, 5-year averages, 1935-64 and annual, 1960-66

Years	Area	Yield	Production	Exports	Domestic availability[1]	
					Total	Per capita
	1,000 hectares	Tons per hectare	1,000 tons	1,000 tons	1,000 tons	Kilograms
5-year averages:						
1935-39............	4,092	1.39	5,677	2	5,675	146.6
1950-54............	4,989	1.24	6,184	76	6,108	110.9
1955-59............	5,939	1.23	7,322	16	7,306	114.3
1960-64............	7,232	1.30	9,367	156	9,211	122.3
Years:						
1960...............	6,681	1.28	8,554	10	8,544	120.3
1961...............	6,886	1.31	8,999	4	8,995	123.0
1962...............	7,348	1.29	9,487	6	9,481	125.9
1963...............	7,920	1.32	10,418	700	9,718	125.4
1964...............	7,326	1.28	9,378	62	9,316	116.7
1965[2]...............	8,523	1.42	12,112	560	11,552	140.5
1966[2]...............	7,733	1.29	10,013	550	9,463	111.7

[1] Production minus exports. Imports are negligible and reliable stock changes are not available. [2] Preliminary.

Sources: (11), (25), (35) and table 4.

Table 31.--Rice (rough): Area, yield, production, exports, and domestic availability, Brazil, 5-year averages, 1935-64 and annual, 1960-66

Years	Area	Yield	Production	Exports	Domestic availability[1]	
					Total	Per capita
	1,000 hectares	tons per hectare	1,000 tons	1,000 tons	1,000 tons	Kilograms
5-year averages:						
1935-39.............	956	1.43	1,365	60	1,305	33.7
1950-54.............	2,060	1.53	3,154	107	3,047	55.3
1955-59.............	2,551	1.51	3,846	49	3,797	59.4
1960-64.............	3,447	1.57	5,405	60	5,345	71.0
Years:						
1960................	2,966	1.62	4,795	1	4,794	67.5
1961................	3,174	1.70	5,392	222	5,170	70.7
1962................	3,350	1.66	5,557	64	5,493	72.9
1963................	3,722	1.47	5,462	0	5,462	70.5
1964................	4,023	1.45	5,818	12	5,806	72.8
1965[2]................	4,208	1.66	7,000	237	6,763	82.3
1966[2]................	4,289	1.59	6,800	375	6,425	75.8

[1] Production minus exports. Imports are negligible and reliable stock changes are not available. [2] Preliminary.

Sources: (11), (25), (35), and table 4.

Table 32.--Wheat: Brazilian and U.S. estimates of area, yield, production, imports, and domestic availability, 5-year average, 1935-64 and annual, 1960-66

Period	Area	Yield	Production	Imports	Domestic availability[1]	
					Total	Per capita
	1,000 hectares	Tons per hectare	1,000 tons	1,000 tons	1,000 tons	Kilograms
Brazilian estimates:[2]						
5-year averages:						
1935-39..........	168	0.80	135	942	1,077	27.8
1950-54..........	836	.79	658	1,439	2,097	38.1
1955-59..........	1,173	.67	787	1,641	2,428	38.0
1960-64..........	887	.69	600	2,185	2,785	36.9
Years:						
1960.............	1,141	.62	713	2,033	2,746	38.7
1961.............	1,022	.53	544	1,886	2,430	33.2
1962.............	743	.95	706	2,200	2,906	38.6
1963.............	793	.49	392	2,186	2,578	33.3
1964.............	734	.88	643	2,622	3,265	40.9
1965[3]............	756	.85	642	1,876	2,518	30.6
U.S. Department of Agriculture estimates:						
5-year averages:						
1935-39..........	168	0.80	135	942	1,077	27.8
1950-54..........	597	.89	531	1,439	1,970	35.8
1955-59..........	966	.69	662	1,641	2,303	36.0
1960-64..........	541	.47	243	2,185	2,429	32.2
Years:						
1960.............	809	.44	354	2,033	2,387	33.6
1961.............	567	.36	204	1,886	2,090	28.6
1962.............	577	.48	275	2,200	2,475	32.9
1963.............	445	.27	122	2,186	2,308	29.8
1964.............	309	.84	261	2,622	2,883	36.1
1965[3]............	311	.74	230	1,876	2,106	25.6
1966[3]............	405	.74	300	2,228	2,528	29.8

[1] Production plus imports. Exports are negligible and reliable stock changes are not available. [2] Departamento Economico. [3] Preliminary.

Sources: (11), (25), (35), and table 4.

Table 33.--Sugarcane and sugar: Area, yield, sugarcane production, cane processed for sugar, sugar exports, and domestic availability of sugar, Brazil, 5-year averages, 1935-64 and 1960-66

Period	Area	Yield	Sugarcane production	Cane processed for sugar	Centrifugal production	Sugar exports	Domestic sugar availability[1]	
							Total	Per capita
	1,000 hectares	Tons per hectare	- - - - - - - - -	- - - - - - - - -	1,000 tons	- - - - - - - - -	- - - - - - - - -	Kilograms
5-year averages:								
1935-39.......	464	37.5	17,384	[2] 8,209	[2] 871	[2] 46	[2] 825	[2] 21.3
1950-54.......	928	39.0	36,201	19,229	1,783	101	1,682	30.5
1955-59.......	1,174	40.2	47,232	29,281	2,633	502	2,131	33.3
1960-64.......	1,451	42.9	61,792	36,361	3,281	556	2,725	36.1
Years:								
1960..........	1,340	42.5	56,927	37,029	3,319	771	2,548	35.9
1961..........	1,367	43.4	59,377	36,579	3,354	783	2,571	35.2
1962..........	1,467	42.6	62,535	35,181	3,238	445	2,793	37.1
1963..........	1,509	42.2	63,723	34,249	3,068	527	2,541	32.8
1964..........	1,519	43.7	66,399	38,767	3,425	253	3,172	39.7
1965[3].........	1,705	44.5	75,853	51,200	4,660	760	3,900	47.4
1966[3].........	1,500	42.7	64,000	43,200	3,900	900	3,000	35.4

[1] Production less exports. Reliable stocks are not available. [2] 1938-39. [3] Preliminary.

Sources: (11), (25), (35), Instituto de Acucar e do Alcool, and table 4.

Table 34.--Mandioca: Area, yield, production, exports, and domestic availability, Brazil, 5-year averages, 1935-64 and annual 1960-66

Years	Area	Yield	Production	Exports[1]	Domestic availability[2]	
					Total	Per capita
	1,000 hectares	Tons per hectare	1,000 tons	1,000 tons	1,000 tons	Kilograms
5-year averages:						
1935-39	413	13.4	5,551	36	5,515	142.5
1950-54	1,020	12.8	13,039	85	12,954	235.1
1955-59	1,197	13.0	15,510	84	15,426	241.4
1960-64	1,507	13.5	20,424	152	20,272	268.2
Years:						
1960	1,342	13.1	17,613	269	17,344	244.3
1961	1,381	13.1	18,058	140	17,918	245.1
1962	1,476	13.4	19,843	50	19,793	262.9
1963	1,618	13.8	22,249	45	22,204	286.5
1964	1,716	14.2	24,356	255	24,101	302.0
1965[3]	1,750	14.3	25,000	354	24,646	299.8
1966[3]	1,500	13.3	20,000	120	19,880	234.7

[1] Converted to fresh equivalent at 4 times product weight. [2] Production minus exports. There were no recorded imports. All in fresh equivalent. [3] Preliminary.

Sources: (11), (25), (35), and table 4.

Table 35.--Sweetpotatoes: Area, yield, production, and per capita availability, Brazil, 5-year averages, 1935-64 and annual, 1960-66

Years	Area	Yield	Production	Per capita availability[1]
	1,000 hectares	Tons per hectare	1,000 tons	Kilograms
5-year averages:				
1935-39	60	8.3	500	12.9
1950-54	103	8.4	868	15.8
1955-59	118	9.2	1,082	16.9
1960-64	145	10.0	1,446	19.1
Years:				
1960	133	9.6	1,280	18.0
1961	137	9.9	1,356	18.5
1962	145	10.0	1,448	19.2
1963	152	10.2	1,546	19.9
1964	158	10.1	1,598	20.0
1965[2]	168	10.2	1,721	20.9
1966[2]	175	10.3	1,800	21.3

[1] No exports or imports reported. [2] Preliminary.

Sources: (11), (25), (35), and table 4.

Table 36.--Potatoes: Area, yield, production, imports, and domestic availability, Brazil, 5-year averages, 1935-64 and annual, 1960-66

Years	Area	Yield	Production	Imports	Domestic availability[1]	
					Total	Per capita
	1,000 hectares	Tons per hectares	1,000 tons	1,000 tons	1,000 tons	Kilograms
5-year averages:						
1935-39	66	5.8	384	3	387	100.0
1950-54	156	4.9	759	22	781	14.1
1955-59	187	5.3	988	10	998	15.6
1960-64	199	5.8	1,152	6	1,158	15.4
Years:						
1960	199	5.6	1,113	9	1,122	15.8
1961	191	5.7	1,080	3	1,083	14.8
1962	196	5.8	1,134	5	1,139	15.1
1963	200	5.8	1,168	10	1,178	15.2
1964	209	6.0	1,264	4	1,268	15.9
1965[2]	202	6.2	1,240	6	1,246	15.1
1966[2]	171	6.3	1,070	6	1,066	12.6

[1] Production plus imports. Exports have been negligible except for 14,635 tons in 1964 which were subtracted to give 1964 and the 1960-64 average availability. [2] Preliminary.

Sources: (11), (25), (35), and table 4.

Table 37.--Dried beans: Area, yield, production and per capita availability, Brazil, 5-year averages, 1935-64 and annual, 1960-66

Years	Area	Yield	Production	Per capita availability[1]
	1,000 hectares	Kg. per hectare	1,000 tons	Kilograms
5-year averages:				
1935-39	951	865	823	21.3
1950-54	1,925	683	1,314	23.8
1955-59	2,262	658	1,488	23.3
1960-64	2,794	651	1,816	24.1
Years:				
1960	2,560	676	1,731	24.4
1961	2,581	676	1,745	23.9
1962	2,716	630	1,710	22.7
1963	2,982	651	1,942	25.1
1964[2]	3,130	623	1,951	24.4
1965[2]	3,273	700	2,290	27.9
1966[2]	3,490	446	1,558	18.4

[1] Based on production. Exports and imports generally are negligible and stocks are not available. [2] Preliminary.

Sources: (11), (25), (35) and table 4.

Table 38.--Bananas: Area, yield, production, exports, and domestic availability, Brazil, 5-year averages, 1935-64 and annual, 1960-66

Years	Area	Yield	Production[1]	Exports	Domestic availability[2]	
					Total	Per capita
	1,000 hectares	Tons per hectare	1,000 tons	1,000 tons	1,000 tons	Kilograms
5-year averages:						
1935-39.........	73	21.5	1,566	220	1,346	34.8
1950-54.........	126	18.6	2,343	182	2,161	39.2
1955-59.........	164	18.0	2,952	220	2,732	42.8
1960-64.........	207	18.5	3,832	227	3,605	47.7
Years:						
1960............	185	18.0	3,328	242	3,086	43.5
1961............	194	18.2	3,523	246	3,277	44.8
1962............	209	18.7	3,913	216	3,697	49.1
1963............	221	18.4	4,069	206	3,863	49.8
1964............	228	19.0	4,329	226	4,103	51.4
1965[3]...........	238	19.1	4,537	216	4,321	52.6
1966[3]...........	250	19.0	4,745	240	4,505	53.2

[1] Reported bunches converted at an average of 13 kilos per bunch; exports average an estimated 20 kilograms per bunch. [2] Production minus exports. There were no reported imports. [3] Preliminary.

Sources: (11), (25), (35), and table 4.

Table 39.--Oranges: Area, yield, production, exports, and domestic availability, Brazil, 5-year averages, 1935-64 and annual, 1960-66

Years	Area	Yield	Production[1]	Exports	Domestic availability[2]	
					Total	Per capita
	1,000 hectares	Tons per hectare	1,000 tons	1,000 tons	1,000 tons	Kilograms
5-year averages:						
1935-39........	105	10.2	1,071	140	931	24.1
1950-54........	77	16.0	1,235	40	1,195	21.7
1955-59........	91	15.9	1,444	64	1,380	21.6
1960-64........	128	14.8	1,889	114	1,775	23.5
Years:						
1960...........	112	14.9	1,672	112	1,560	22.0
1961...........	119	14.8	1,762	113	1,649	22.6
1962...........	126	14.7	1,851	104	1,747	23.2
1963...........	139	15.2	2,106	144	1,962	25.3
1964...........	144	14.3	2,055	97	1,958	24.5
1965[3]..........	150	15.6	2,337	159	2,178	26.5
1966[3]..........	150	15.0	2,244	150	2,094	24.7

[1] Oranges reported converted at 5,000 oranges per ton. [2] Production minus exports; there were no imports. [3] Preliminary.

Sources: (11), (25), and (35) and table 4.

Table 40.--Fruit: Imports, volume and value, Brazil, 5-year averages, 1950-64 and annual, 1960-64

Years	Volume				Value			
	Dried	Fresh	Canned	Total	Dried	Fresh	Canned	Total
	1,000 tons				Million dollars			
5-year averages:								
1950-54............	6.0	69.3	7.5	82.8	3.3	20.9	3.3	27.5
1955-59............	4.3	43.9	6.5	54.7	2.3	10.9	1.9	15.1
1960-64............	5.8	59.2	9.7	74.7	2.2	10.5	2.7	15.5
Years:								
1960...............	5.5	49.8	7.5	62.8	1.9	6.2	1.6	9.7
1961...............	5.1	54.3	8.1	67.5	2.1	7.2	1.8	11.1
1962...............	5.7	65.0	9.8	80.5	2.3	11.5	2.8	16.6
1963...............	5.0	76.6	13.0	94.6	2.0	15.6	4.0	21.6
1964...............	7.7	50.2	10.2	68.1	2.9	12.0	3.4	18.3

Source: (25).

Table 41.--Oils, fats, and waxes: Production by type, Brazil, 5-year averages, 1950-64 and annual, 1966[1]

Commodity	5-year averages			Years						
	1950-54	1955-59	1960-64	1960	1961	1962	1963	1964	1965[2]	1966[2]
Vegetable Oils:					Tons					
Edible:										
Cottonseed.....	80,680	83,602	118,268	92,345	116,230	133,503	130,825	118,434	103,169	144,200
Peanut oil.....	28,401	52,442	72,985	63,183	91,808	90,349	78,034	41,551	102,885	120,440
Soybean oil....	1,018	6,306	25,793	16,632	21,594	26,300	30,312	34,129	45,540	66,500
Sesame.........	1,086	786	651	1,191	819	122	37	1,086	1,376	1,500
Corn...........	2,020	2,983	4,683	3,025	6,460	4,234	5,226	4,470	5,130	5,500
Other[3].........	n.a.	n.a.	14	5	3	8	1	54	1,589	2,000
Subtotal.....	113,205	146,119	222,394	176,381	236,914	254,516	244,435	199,724	259,689	340,140
Palm:										
Babassu........	30,655	36,625	53,367	58,175	52,038	59,601	45,170	51,851	54,102	60,000
Dende..........	1,122	2,966	4,861	3,418	3,993	5,126	5,340	6,429	8,491	9,000
Other[4].........	1,437	8,105	7,927	5,168	9,124	6,675	7,976	10,890	21,960	25,000
Subtotal.....	33,214	47,696	66,155	66,761	65,155	71,402	58,486	68,970	84,553	94,000
Industrial and drying:										
Castor oil.....	38,548	60,684	92,704	54,381	105,097	79,336	91,213	133,492	170,671	100,000
Linseed oil....	9,032	7,537	7,522	9,348	8,456	6,808	8,962	4,039	8,214	6,200
Oiticica oil...	8,691	10,106	16,819	19,555	16,483	25,141	5,784	17,133	12,118	20,000
Cocoa butter...	7,394	13,871	15,592	18,489	15,932	17,629	15,875	10,035	18,065	18,000
Tung oil.......	931	1,102	1,137	787	1,517	1,007	1,877	495	1,217	1,700
Coffee oil.....	n.a.	n.a.	3,461	3,765	5,451	4,335	2,101	1,655	2,771	3,000
Other[5].........	1,312	1,945	2,472	3,108	2,097	2,304	2,307	2,542	2,256	2,200
Subtotal.....	65,908	95,245	139,707	109,433	155,033	136,560	128,119	169,391	215,312	151,100
Total vegetable oils..........	212,327	289,060	428,256	352,575	457,102	462,478	431,040	438,085	559,554	585,240
Animal fats and oils:										
Butter...........	24,055	28,499	25,768	25,318	26,335	29,779	22,041	25,368	24,752	35,000
Edible slaughter:										
Lard...........	77,929	84,454	88,077	87,204	97,601	92,151	82,229	81,197	92,718	100,000
Tallow.........	4,457	4,370	4,001	4,596	3,903	3,724	3,668	4,115	5,565	5,000
Shortening (composts)....	4,521	5,947	3,468	6,424	3,525	2,332	2,971	2,087	2,831	3,000
Stearin oil....	n.a.	n.a.	163	n.a.	12	530	37	238	102	220
Subtotal.....	86,907	94,771	95,709	98,224	105,041	98,737	88,905	87,637	101,216	108,220
Industrial slaughter:										
Tallow.........	39,103	46,351	48,210	45,553	50,039	47,952	47,410	50,096	49,687	49,000
Other[6].........	47	1,615	2,357	3,747	2,914	1,947	1,555	1,620	1,819	1,800
Subtotal.....	39,150	47,966	50,567	49,300	52,953	49,899	48,965	51,716	51,506	50,800
Total animal fats and oil	150,112	171,236	172,044	172,842	184,329	178,415	159,911	164,721	177,474	194,020
Vegetable waxes:										
Carnauba.......	9,280	8,265	11,865	10,982	11,445	12,102	11,767	13,031	12,729	12,000
Licuri.........	2,233	426	222	212	157	192	370	178	185	180
Total waxes..	11,513	8,691	12,087	11,194	11,602	12,294	12,137	13,209	12,914	12,180
Total fats, oils, and waxes......	373,952	468,987	612,387	536,611	653,033	653,187	603,088	616,015	749,942	791,440

[1] Excludes essential oils and beeswax. Beeswax production reportedly averaged 1,253 tons annually for 1962-64.
[2] Preliminary. [3] Mainly sunflower. [4] Including coconut, licuri, tucum, murumum, macauba and mixed palm oils.
[5] Cashew nut, Brazil nut, ucuula andiroba, copaiba and others. [6] Industrial lard, stearin, glycerine, and neat's-foot oil.

Source: (1).

Table 42.--Peanuts: Area, yield, production, exports, and domestic availability, Brazil, 5-year averages, 1935-64 and annual, 1960-66

Years	Area	Yield	Production	Exports[1]	Domestic availability[2]	
					Total	Per capita
	1,000 hectares	Tons per hectare	1,000 tons	1,000 tons	Tons	Kilograms
5-year averages:						
1935-39........	n.a.	n.a.	13	negl.	13	0.3
1950-54........	137	1.07	146	1	145	2.6
1955-59........	196	1.25	245	6	239	3.7
1960-64........	411	1.32	543	18	525	7.0
Years:						
1960...........	291	1.40	408	0	408	5.7
1961...........	436	1.34	584	6	578	7.9
1962...........	476	1.36	648	33	615	8.2
1963...........	422	1.43	604	50	554	7.1
1964...........	430	1.09	470	0	470	5.9
1965[3]..........	541	1.37	743	26	717	8.7
1966[3]..........	632	1.23	777	19	758	8.9

[1] Converted to unhulled basis. Includes seed equivalent of 222 tons of peanut oil exported in 1962 and 8,419 tons in 1963 converted at the rate of 29 percent oil yield per ton of unhulled peanuts. [2] Production minus exports. No imports of peanuts were reported. Consistent stock reports are not available. Imports of peanut oil were negligible in all years. [3] Preliminary.

Sources: (11), (25), (35), and table 4.

Table 43.--Soybeans: Area, yield, production, exports, and domestic availability, Brazil, 5-year averages, 1950-64 and annual, 1960-66[1]

Period	Area	Yield	Production	Net exports[2]	Domestic availability[3]	
					Total	Per capita
	1,000 hectares	Tons per hectare	1,000 tons	1,000 tons	1,000 tons	Kilograms
5-year averages:						
1950-54........	51	1.49	76	28	48	1.2
1955-59........	95	1.32	125	37	88	1.4
1960-64........	285	1.04	290	34	255	3,3
Years:						
1960...........	171	1.20	206	0	206	2.9
1961...........	241	1.12	271	73	193	2.6
1962...........	314	1.10	345	82	263	3.5
1963...........	340	0.95	323	25	298	3.8
1964...........	360	.85	305	-10	315	3.9
1965[4]..........	432	1.21	523	57	466	5.7
1966[4]..........	450	1.20	542	121	421	5.0

[1] 1935-39 was negligible. [2] There was no reported export of soybean oil in the period. Exports were adjusted to reflect imports of soybean oil as follows: 1962, 2,770 tons; 1963, 1,368 tons; and 1964, 1,778 tons, using a conversion factor of 5.49. [3] Production minus net exports. Stock changes were not available. [4] Preliminary.

Sources: (11), (25), (35), and table 4.

Table 44.--Castor beans: Area, yield, production, exports, and domestic availability, Brazil, 5-year averages, 1935-64, and annual, 1960-66

Years	Area	Yield	Production	Exports[1]	Domestic availability[2]	
					Total	Per capita
	1,000 hectares	Kg. per hectare	1,000 tons	1,000 tons	1,000 tons	Kilograms
5-year averages:						
1935-39.......	120	1,117	134	109	25	0.6
1950-54.......	220	773	170	102	68	1.2
1955-59.......	223	789	176	117	59	0.9
1960-64.......	295	816	242	170	72	1.0
Years:						
1960..........	255	882	225	93	132	1.9
1961..........	283	735	208	202	6	0.1
1962..........	284	792	225	135	90	1.2
1963..........	307	782	240	172	68	0.9
1964..........	348	891	310	247	63	0.8
1965[3].........	394	901	355	311	44	0.8
1966[3].........	315	730	230	n.a.	n.a.	n.a.

[1] Bean equivalent; oil converted to beans at the rate of 45 percent oil per ton of castor beans. [2] Production minus exports. Reliable stock changes are not available. There were no imports of castorbeans or oil. [3] Preliminary.

Sources: (11), (25), (35), and table 4.

Table 45.--Fats, oils, and waxes: Total production, trade and domestic availability, Brazil, 5-year averages, 1950-64, and annual, 1960-66[1]

Years	Production	Exports	Imports	Domestic availability	
				Total	Per capita
	- - - - - - - - - - - - - Tons - - - - - - - - - - - - - - -				Kilograms
5-year averages:					
1950-54........	373,952	55,300	13,541	332,193	6.0
1955-59........	468,987	73,123	11,736	407,600	6.4
1960-64........	612,387	121,777	22,473	513,083	6.8
Years:					
1960...........	536,611	87,105	13,149	462,655	6.5
1961...........	653,033	133,017	10,562	530,578	7.2
1962...........	653,187	115,182	15,523	513,528	6.8
1963...........	603,088	126,081	15,417	492,424	6.4
1964...........	616,015	147,503	57,813	526,325	6.6
1965[2]..........	749,942	134,648	20,844	636,138	7.7
1966[2]..........	791,440	n.a.	n.a.	n.a.	n.a.

[1] Includes reported production and trade of all fats, oils, and waxes, including butter and cocoa butter but excepting "essential" oils and beeswax.
[2] Preliminary.

Sources: (11), (25), (35), table 4, and table 41.

Table 46.--Trade in fats, oils, and waxes, Brazil, 1955-59 and 1960-64[1]

Trade	1955-59	1960-64
	Tons	Tons
Export		
Castor oil...........	39,212	76,368
Oiticica oil.........	6,998	11,732
Carnauba wax.........	11,465	10,664
Licuri and other vegetable waxes....	505	570
Peanut oil...........	--	1,684
Soybean oil..........	--	--
Cottonseed oil.......	--	1,364
Cocoa butter.........	13,111	15,750
Other fats, oils and waxes..............	1,832	3,645
Total..............	73,123	121,777

Trade	1955-59	1960-64
	Tons	Tons
Imports		
Olive oil..........	7,640	9,491
Cottonseed oil.....	502	3,479
Soybean oil........	--	1,308
Tallow.............	142	3,678
Lard...............	1,763	756
Butter.............	437	2,197
Other..............	1,252	1,564
Total............	11,736	22,473

[1] Excludes essential oils and beeswax.

Sources: (11), (25), and (27).

Table 47.--Age, sex composition of Brazil's cattle herd, 1950[1]

Classification	Reported number on farms and ranches	Percentage of total
	Thousand head	Percent
Cows................................	16,381	34.9
Heifers.............................	4,830	10.3
Calves under 1 year.................	7,743	16.5
Calves 1-2 years, female............	4,602	9.8
Calves 1-2 years, male..............	4,325	9.2
Bulls...............................	836	1.8
Steers..............................	5,883	12.6
Total...........................	44,600	95.1
Work animals[2].......................	2,291	4.9
Total...........................	46,891	100.0

[1] 1960 census data is not available. 1950 census data, numbers reported by 1,094,430 establishments; an additional 197,387 head were reported by 4,425 informants not on farms. [2] Not elsewhere specified.

Source: (13).

Table 48.--Indicated calving rates reported in the agricultural census, Brazil, 1950

Classification	Calves as a percentage of--		
	Cows	Cows and heifers	Total herd numbers
	Percent		
Calves under 1 year	47.2	36.5	16.5
Half of calves under 2 years	50.8	39.2	17.7
Half of calves under 2 years plus reported calf slaughter of 241,000 head	51.5	39.7	17.8

Sources: (11) and (13).

Table 49.--Milk: Production of milk and selected inspected milk products, Brazil, 5-year averages, 1950-64

Product	1950-54		1955-59		1960-64		
	Production	Milk equiv.	Production	Milk equiv.	Production	Milk equiv.	Percentage of total
	1,000 tons						Percent
Inspected milk:							
Pasteurized milk	186.6	186.6	271.1	271.7	427.6	427.6	7.9
Powdered milk[1]	11.8	82.6	27.9	195.3	49.3	345.1	6.4
Canned milk[2]	2.3	5.6	20.3	48.6	18.3	43.9	.8
Cheese[3]	28.5	91.2	38.4	122.9	41.2	131.8	2.5
Subtotal[4]	--	366.0	--	638.5	--	948.4	17.6
Uninspected milk		2,701.0		3,761.9		4,449.6	82.4
Total		3,067.0		4,400.4		5,398.0	100.0

[1] Converted at 7.0 times product weight.

[2] Condensed and concentrated milk converted at 2.4 times product weight and evaporated milk converted at 2.0 times product weight.

[3] Hard, soft, and riccota cheese converted at 3.2 times product weight.

[4] Excludes butter, cream, and minor industrial products assumed accounted for in milk equivalent of cheese and skim milk powder.

Sources: (11) and (35).

Table 50.--Coffee: Area, yield, production, exports, and domestic consumption, Brazil, 5-year averages, 1935-64, and annual, 1960-66

Years	Area	Yield	Production	Exports	Domestic consumption[1]	
					Total	Per capita
	1,000 hectares	Kg. per hectare	1,000 tons	1,000 tons	1,000 tons	Kilograms
5-year averages:						
1935-39.......	3,496	435	1,520	903	216	5.6
1950-54.......	2,830	404	1,143	882	261	4.7
1955-59.......	3,745	453	1,698	902	296	4.6
1960-64.......	4,235	359	1,550	1,016	422	5.6
Years:						
1960..........	4,420	394	1,740	1,009	420	5.9
1961..........	4,384	479	2,100	1,018	420	5.7
1962..........	4,463	363	1,620	983	420	5.6
1963..........	4,286	395	1,692	1,171	420	5.4
1964..........	3,622	166	600	897	432	5.4
1965[2].........	3,622	620	2,244	808	450	5.5
1966[2].........	3,622	348	1,260	1,010	480	5.7

[1] Based on USDA estimates which allow for changes in stocks, losses, and industrial use.
[2] Preliminary.

Sources: (11), (25), (35), and table 4.

Table 51: Cotton: SEP and USDA estimates of area, yield, production, exports, and domestic availability, Brazil, 5-year averages, 1935-64, and annual, 1960-66

Period	Area	Yield	Production	Exports	Domestic availability[1]	
					Total	Per capita
Brazilian estimates:[2]	1,000 hectares	Kg. per hectare	1,000 tons	1,000 tons	1,000 tons	Kilograms
5-year averages:						
1935-39	2,118	202	427	233	194	5.0
1950-54	2,659	155	412	150	262	4.8
1955-59	2,701	154	415	101	314	4.9
1960-64	3,385	179	604	211	393	5.2
Years:						
1960	2,930	183	536	95	441	6.2
1961	3,234	188	609	224	385	5.3
1962	3,458	183	634	236	398	5.3
1963	3,554	183	652	248	404	5.2
1964	3,749	157	590	252	338	4.2
1965[3]	3,701	148	548	216	332	4.0
USDA estimates:[4]						
5-year averages:						
1935-39	2,251	189	426	233	193	5.0
1950-54	1,894	194	367	150	217	3.9
1955-59	1,748	186	326	91	235	3.7
1960-64	2,226	219	487	207	280	3.7
Years:						
1960	2,023	210	425	151	274	3.9
1961	2,226	247	550	184	366	5.0
1962	2,226	225	501	249	252	3.3
1963	2,327	215	501	223	278	3.6
1964	2,327	196	457	229	228	2.9
1965[3]	2,226	234	544	204	340	4.1
1966[3]	2,226	225	435	218	217	2.6

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[1] Production minus exports. No imports were reported and reliable stock changes are not available. [2] Brazilian cotton year. [3] Preliminary. [4] USDA marketing year beginning August 1.

Sources: (11), (29), United States Department of Agricultural estimates and table 4.

Table 52.--Cocoa beans: Area, yield, production and exports, Brazil, 5-year averages, 1935-64, and annual, 1960-66

Period	Area	Yield[1]	Production		Exports		
			Brazilian estimates	USDA estimates	Beans	Butter	Cocoa powder and cake
	1,000 hectares	Kilograms per hectare	1,000 tons				
5-year averages:							
1935-39.........	188	638	130	120	90	n.a.	8
1950-54.........	309	427	138	132	103	7	10
1955-59.........	412	420	165	173	108	13	16
1960-64.........	473	252	151	118	86	16	11
Years							
1960............	471	269	163	122	125	23	22
1961............	474	245	156	116	104	15	15
1962............	465	239	140	111	55	17	6
1963............	470	262	143	123	69	14	6
1964............	487	244	154	119	75	10	7
1965[2]...........	430	398	159	171	92	17	12
1966[2]...........	430	409	n.a.	176	112	21	6

[1] Based on USDA production estimates. [2] Preliminary.

Sources: (11), (25), (35), and USDA estimates.

Table 53.--Tobacco: Brazilian and USDA estimates of area, yield, production, exports, and domestic availability, 5-year averages, 1935-64, and annual, 1960-66

Period	Area	Yield	Production	Exports	Domestic availability[1]	
					Total	Per capita
Brazilian estimates:	1,000 hectares	Kg. per hectare	1,000 tons	1,000 tons	1,000 tons	Kilograms
5-year averages:						
1935-39	102	912	93	33	60	1.6
1950-54	162	753	122	30	92	1.7
1955-59	186	780	145	30	115	1.8
1960-64	235	793	187	45	141	1.9
Years:						
1960	213	756	161	32	129	1.8
1961	228	737	168	49	119	1.6
1962	232	806	187	42	145	1.9
1963	250	828	207	44	163	2.1
1964	251	837	210	60	150	1.9
1965[2]	274	905	248	55	193	2.3
U.S. Department of Agriculture estimates:						
5-year averages:						
1935-39	96	958	92	33	59	1.5
1950-54	148	824	122	30	92	1.7
1955-59	180	772	139	30	109	1.7
1960-64	195	784	153	45	107	1.4
Years:						
1960	174	850	148	32	116	1.6
1961	183	836	153	49	104	1.4
1962	200	690	138	42	96	1.3
1963	220	850	187	44	143	1.8
1964	197	695	137	60	77	1.0
1965[2]	228	864	197	55	142	1.7
1966[2]	217	834	181	46	135	1.6

[1] Production minus exports. Imports were negligible and reliable stock changes are not available. [2] Preliminary.

Sources: (11), (25), (35), USDA estimates, and table 4.

Table 54.--Barley and malt: Area, yield, production, imports, and domestic supply of barley and malt, Brazil, 5-year averages, 1935-64, and annual, 1960-66

Years	Barley				Malt imports[1]	Domestic supply of barley and malt[1]	
	Area	Yield	Production	Imports		Total	Per capita
	1,000 hectares	Kg. per hectare	1,000 tons	1,000 tons	1,000 tons	1,000 tons	Kilograms
5-year averages:							
1935-39.........	n.a.	n.a.	12	2	n.a.	n.a.	n.a.
1950-54.........	22	954	21	1	61	83	1.5
1955-59.........	31	968	30	4	75	109	1.7
1960-64.........	32	827	26	28	73	127	1.7
Years:							
1960............	37	784	29	16	71	116	1.6
1961............	32	750	24	30	69	123	1.7
1962............	28	1,000	28	31	86	145	1.9
1963............	30	667	20	32	71	123	1.6
1964............	31	935	29	30	69	128	1.6
1965............	34	794	29	40	64	128	1.6
1966[2]...........	36	806	29	n.a.	n.a.	n.a.	n.a.

[1] Barley equivalent converted at 1 to 1.412, malt to barley. [2] Preliminary.

Sources: (11) (25), (35), and table 4.

Table 55.--Sisal: Area, yield, production, exports, and domestic availability, Brazil, 5-year averages, 1950-64, and annual 1960-66

Years	Area	Yield	Production	Exports[1]	Domestic availability[2]	
					Total	Per capita
	1,000 hectares	Tons per hectare	1,000 tons	1,000 tons	1,000 tons	Kilograms
5-year averages:						
1950-54........	65	0.94	60	42	18	0.3
1955-59........	110	.98	108	93	15	.2
1960-64........	172	1.09	186	124	61	0.8
Years:						
1960...........	141	1.16	164	100	64	.9
1961...........	151	1.06	160	118	42	.6
1962...........	160	1.12	180	137	37	.5
1963...........	186	1.07	199	130	69	.9
1964...........	222	1.03	229	136	93	1.2
1965[3]..........	250	.97	242	150	92	1.1
1966[3]..........	175	1.15	200	150	50	.6

[1] Includes exports of manufactured sisal products which has only been significant since 1962. [2] Production minus exports; does not include imports of sisal or sisal products which may have been sizable in some years prior to 1960. Reliable stock changes are not available. [3] Preliminary.

Sources: (11), (25), (35), and table 4.

Table 56.--Jute: Area, yield, production, exports, imports, and domestic availability, Brazil, 5-year averages, 1950-64, and annual, 1960-66

Years	Area	Yield	Production	Exports[1]	Imports	Domestic availability[2]	
						Total	Per capita
	1,000 hectares	Tons per hectare	1,000 tons	1,000 tons	1,000 tons	1,000 tons	Kilograms
5-year averages:							
1950-54........	18	1.06	19	(3)	6	25	0.5
1955-59........	25	1.24	31	(3)	0	31	.5
1960-64........	36	1.25	44	2	0	43	.6
Years:							
1960...........	28	1.71	48	(3)	0	48	.7
1961...........	36	1.33	48	(3)	0	48	.7
1962...........	41	1.10	45	(3)	0	45	.6
1963...........	36	1.00	36	3	0	33	.4
1964...........	40	1.12	45	5	0	40	.5
1965[4]..........	42	1.41	59	10	0	49	.6
1966[4]..........	44	1.09	48	4	0	44	.5

[1] Includes manufactured products.

[2] Production minus exports and plus imports. Does not include imports of manufactured jute products which were sizable in some years prior to 1955-59. Reliable stock changes are not available. [3] Less than 500 tons [4] Preliminary.

Sources: (11), (25), (35), and table 4.

Table 57.--Value of U.S. trade with Brazil, agricultural and total, 5-year averages 1935-64, and annual, 1960-65

Period	U.S. Imports from Brazil			U.S. Exports to Brazil		
	Total	Agricultural	Agricultural as percent of total	Total	Agricultural	Agricultural as percent of total
	Million	Dollars	Percent	Million	Dollars	Percent
5-year averages:						
1935-39........	105.1	102.5	98	60.4	1.7	3
1940-44........	194.5	162.7	84	146.3	3.5	2
1945-49........	444.1	409.8	92	417.6	42.4	10
1950-54........	775.0	738.5	95	470.5	39.2	8
1955-59........	646.2	590.8	91	388.0	36.6	9
1960-64........	553.7	481.1	87	418.8	100.0	24
Years:						
1960...........	563.5	495.5	88	422.5	44.2	10
1961...........	564.0	483.6	86	485.4	112.2	23
1962...........	543.4	462.2	85	423.7	94.5	22
1963...........	562.9	492.9	88	376.1	102.0	27
1964...........	534.9	471.2	88	386.2	147.1	38
1965...........	545.4	413.3	76	328.0	59.3	18
1966[1]..........	602.6	483.7	80	565.3	101.2	18

[1] Preliminary.

Source: Census Bureau, U.S. Department of Commerce.

Table 58.--U.S. agricultural exports to Brazil and Latin America under Public Law 480, 5-year averages, 1955-64, and annual, 1960-66

Year	P.L. 480 exports to--		Total U.S. agricultural exports to--		Percentage under P.L. 480 to--	
	Brazil	Latin America	Brazil	Latin America	Brazil	Latin America
	Million dollars				Percent	
5-year average:						
1955-59.......	28.5	88.6	36.6	513.5	78	17
1960-64.......	88.7	173.2	100.0	503.0	86	34
Years:						
1960..........	33.2	94.7	44.2	482.6	75	20
1961..........	106.0	188.1	112.2	490.9	94	38
1962..........	77.0	148.9	94.5	437.7	81	34
1963..........	86.5	178.3	102.0	500.0	85	36
1964..........	140.7	256.0	147.1	603.9	96	42
1965..........	46.4	150.9	59.3	509.8	78	30
1966[1].........	89.9	211.5	101.2	575.0	89	37

[1] Preliminary.

Sources: (26), (34), and USDA estimates.

Table 59.--Quantity and value of U.S. agricultural imports from Brazil by principal commodities, 5-year averages, 1955-64, annual, 1960-65

Commodity	5-year averages		Years						
	1955-59	1960-64	1960	1961	1962	1963	1964	1965	1966[1]
	Tons								
Coffee	534,925	521,574	555,028	517,984	545,569	556,501	432,788	344,631	403,863
Sugar	2,093	265,003	91,445	293,519	345,676	418,202	176,175	256,496	485,193
Cocoa beans	55,174	41,166	60,420	49,887	17,420	41,196	36,907	55,035	74,483
Cocoa butter	1,696	3,900	4,453	3,595	5,072	3,856	2,524	2,729	4,747
Cocoa, unsweetened	8,956	5,989	14,467	6,857	2,377	1,895	4,349	1,172	4,575
Castor oil	25,981	38,256	19,031	50,378	40,367	39,622	41,994	56,097	37,658
Brazil nuts	12,278	11,048	11,846	14,677	10,524	6,432	11,760	8,604	13,368
Carnauba wax	7,827	5,474	5,514	5,782	4,359	5,991	5,726	6,181	6,516
Sisal and henequen	59,744	25,000	18,000	24,000	28,000	26,000	28,000	27,649	20,321
Meat and casings	5,531	5,414	4,093	7,395	7,938	2,905	4,739	11,232	8,662
Hides and skins	2,763	2,034	2,106	2,022	1,788	2,325	1,933	2,956	3,003
Tapioca flour	20,789	20,357	34,666	23,078	12,437	6,077	25,526	41,136	32,562
Rubber	1,226	1,539	2,108	2,028	1,358	1,029	1,171	253	1,017
Oiticica oil	4,384	4,348	6,726	3,230	10,535	1,250	(2)	(2)	(2)
Tobacco	(2)	778	(2)	185	466	1,129	2,109	1,921	1,868
Total	743,367	951,880	829,903	1,004,617	1,033,886	1,114,410	775,701	816,092	1,097,836
	1,000 dollars								
Coffee, green and roasted	495,722	374,217	398,888	368,141	362,528	363,864	377,664	303,385	327,681
Sugar	258	33,080	10,903	34,362	40,042	58,287	21,805	29,816	56,207
Cocoa beans	37,663	19,676	32,492	21,804	7,355	19,611	17,119	15,356	31,161
Cocoa butter	2,345	4,090	5,012	3,391	5,205	4,099	2,741	2,165	4,589
Cocoa, unsweetened	3,670	1,019	3,317	869	250	187	474	99	421
Castor oil	6,787	9,327	4,591	13,449	9,975	9,335	9,316	10,701	8,598
Brazil nuts	6,344	6,689	7,820	8,116	5,421	5,825	6,265	6,025	8,603
Carnauba wax	11,538	6,367	8,606	7,781	4,694	5,419	5,335	5,523	4,743
Sisal and henequen	5,833	5,021	3,266	4,106	4,487	6,169	7,078	4,139	2,299
Meat and casings	3,671	4,438	3,159	6,536	6,400	2,184	3,913	9,716	8,189
Hides and skins	5,558	4,382	4,596	4,435	4,331	4,156	4,391	5,280	11,502
Tapioca flour	2,265	1,587	2,856	1,850	1,092	717	1,421	2,689	2,371
Rubber	660	1,407	1,910	2,455	1,044	610	1,016	222	1,371
Oiticica oil	1,207	994	1,667	776	1,936	588	(2)	(2)	(2)
Tobacco	(2)	1,118	(2)	171	539	1,818	3,064	2,329	2,340
Other products	7,280	7,666	6,399	5,394	6,853	10,047	9,603	15,902	13,636
Total	590,801	481,078	495,482	483,636	462,152	492,916	471,205	413,347	483,711
	Percent								
Agricultural as percent of total value	91	87	88	86	85	88	88	76	80

[1] Preliminary. [2] None or less than 0.5 units shown.

Source: U.S. Bureau of the Census.

☆ GPO : 1967 O - 302-065 (13)

Table 60.--Quantity and value of U.S. agricultural exports to Brazil by principal commodities, 5-year averages, 1955-64, and annual, 1960-66

Commodity	5-year averages		Years						
	1955-59	1960-64	1960	1961	1962	1963	1964	1965	1966[1]
					Tons				
Wheat[2]	437,164	1,296,626	618,348	1,708,321	1,199,681	1,238,416	1,718,366	495,739	1,219,277
Wheat flour[2]	11,868	7,037	1,937	4,506	8,048	7,593	13,100	18,598	19,505
Hops	493	894	833	864	884	1,027	861	837	1,114
Barley malt	1,879	304	425	586	10	500		(3)	45
Dairy Products[2]	8,083	23,898	7,255	12,956	28,396	35,237	35,648	36,991	19,447
Cottonseed oil, refined	771	3,077	(3)	(3)	(3)	(3)	15,386	4,460	13
Essential oils	21	38	40	29	51	37	30	30	55
Soybean oil, crude	(3)	999	(3)	(3)	(3)	(3)	4,994	(3)	(3)
Lard	1,495	1,736	28	31	8	(3)	8,614	157	(3)
Peas, dry, ripe[4]	1,546	3,489	3,768	3,416	1,135	455	8,671	335	306
Beans	1,098	3,208	(3)	698	12,639	523	2,179	618	(3)
Fruits and preparations	259	84	126	95	54	59	84	350	5,120
Vegetables and preparations	114	123	173	113	115	62	152	54	774
Cornmeal[2]	1	7,502	1,070	5,373	6,129	10,741	14,199	12,539	7,942
Rice[2]	(3)	15	(3)	(3)	75	(3)	(3)	(3)	50
Other foods[5]	(6)	(6)	(6)	(6)	(4)	(6)	(6)	(6)	(6)
Total	464,792	1,349,030	634,003	1,736,988	1,257,225	1,294,650	1,822,284	570,708	1,273,648
					1,000 dollars				
Wheat[2]	28,126	83,545	38,699	105,279	76,801	81,522	115,423	28,983	75,339
Wheat flour[2]	1,159	618	228	404	670	642	1,144	1,725	2,168
Hops	937	1,295	1,187	1,192	1,214	1,584	1,299	1,247	1,680
Barley malt	291	42	59	81	1	71	(3)	(3)	63
Dairy products[2]	2,477	6,191	1,948	2,743	7,854	9,957	8,452	12,898	6,966
Cottonseed oil, refined	327	781	(3)	(3)	(3)	(3)	3,906	1,913	6
Essential oils	134	264	253	223	386	240	220	260	465
Soybean oil, crude	(3)	207	(3)	(3)	(3)	(3)	1,034	(3)	(3)
Lard	529	479	9	10	2	(3)	2,374	45	(3)
Peas, dry, ripe[4]	186	430	392	408	143	85	1,121	85	53
Beans[2]	218	569	(3)	121	2,121	89	511	108	(3)
Fruits and preparations	79	37	41	40	26	34	43	158	1,300
Vegetables and preparations	51	142	81	199	176	117	139	40	252
Cornmeal[2]	12	605	93	419	470	923	1,118	1,212	643
Rice[2]	(3)	2	(3)	(3)	12	(3)	(3)	(3)	8
Other food[5]	550	3,253	(3)	139	2,490	5,443	8,193	338	52
Other agr. products	1,478	1,551	1,236	962	2,105	1,311	2,143	[7] 10,290	[7] 12,174
Total	36,554	100,011	44,226	112,220	94,471	102,018	147,120	59,302	101,169
Agr. as percent of total	9	24	10	23	22	27	38	18	18

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[1] Preliminary. [2] Includes relief or charity. [3] None or less than 0.5 units shown. [4] Excluding chick and cowpeas. [5] Relief and charity only. [6] Reported in value only. [7] Includes 13,788 tons of refined soybean oil, of which 12,901 tons were for relief and charity, in 1965 and 13,196 tons, with 11,398 tons for relief and charity, in 1966, valued at $5,704,000 and $5,309,000, respectively.

Source: U.S. Bureau of the Census, Dept of Commerce.

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